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Malden Studies on Health Education and Growth

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IN 1925, the writer made a preliminary report upon a series of health education studies which were undertaken in the city of Malden, Mass., in the fall of 1921 to answer the following questions:

Is health education practicable?
Can the child's habits be changed through health education in school?
What are the best methods in health education?
Does health education have a measurable effect upon growth?

The preliminary report[1] gave clear-cut evidence of the practicability of health training in schools, and presented specific data showing improvement in several health practices. The results of the study looking toward the development of ideal methods are to be found in the books of the Malden Health Series.[2] Brief reports upon special phases of the studies have been made in the *Journal of the National Education Association*.[3] The present report deals only with the last of the four questions.

SELECTION OF GROUPS AND THE COLLECTION OF DATA

The preliminary report describes the procedures used in placing one group of children under an organized health education program and in collecting health and growth data from this group and a similar control group of children. The present paper reports upon the *significance* of growth data. The sanitarian, educator, or statistician will ask two questions at the outset:

Were the experimental and control groups of children fair and comparable samples of the school population?
Were the records collected with accuracy and uniformity?

As shown in the earlier report, the children selected for the study

CHART I

DISTRIBUTION OF WEIGHT BY FIVE POUND CLASSES, OCT. 1921

WEIGHT GROUP	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150	155	160	165	POUNDS
1		5	7	8	5	5	2		1																
2	1		8	11	19	7	9	5	4	1		2													No = 132
3				3	4	8	4	1	4	2		1	1												Exp'L GROUP BOYS
4								1	1	1						1									MEAN WT. = 73.5 LB.
5	2	8	9	6	4	5	4	2	4																
6		3	8	10	12	8	7	3	2	4	1														No = 141
7			2	5	3	7	4	4	3	2	2														Exp'L GROUP GIRLS
8								1	1			2	1	1											MEAN WT. = 73.8 LB.
1	2	3	6	4	5	4	1																		
2	2		8	11	11	7	8	4	2	1				1	1										No = 107
3				5	3	5	4	2			1		1	1											CON'L GROUP BOYS
4										1				1				1		1					MEAN WT. = 74.0 LB.
5		2	9	2	8	1	3	1																	
6		4	4	10	6	3	9	2	5	2		1													No. = 95
7		1		2	2	2	2	2	2	1				1											CON'L GROUP GIRLS
8						1				1	2						2		1				1		MEAN WT. = 76.3 LB.

For purposes of this study the children were separated into groups on the basis of their relationship to normal weight. Groups 1 and 5 include children more than 10 per cent underweight; groups 2 and 6 include children from 90 per cent to 100 per cent of average weight; groups 3 and 7 include children from 100 per cent to 120 per cent of average weight; and groups 4 and 8 include children more than 120 per cent of average weight.

included all children in the 4th, 5th, and 6th grades in the Faulkner and West Schools. The children in the control group consisted of all of the pupils in the same grades at 3 other selected schools. The two groups of children represented the same racial types of similar economic status. The conditions of living of the two groups were not changed except for the health education program given to the children in the experimental group.

Perhaps the best comparative biological data for the two groups will be found from a study of their growth status at the beginning of the experiment (see Table I). Data for boys and for girls are given separately because of their different growth rates. It will be seen that the average age, height, weight, and relationship to normal indicate that the two groups of boys were almost exactly comparable. A similar indication will be seen from a study of Chart I. A similar study for the two groups of girls will show that the girls in the control group were biologically superior to those in the experimental group since, although they were younger, they were taller, heavier, and there were fewer underweight.

These figures show that up to the time the experiment began the growth of the two groups of boys had been practically the same and

TABLE I

ORIGINAL MEASUREMENTS AND GROWTH SUMMARIZING DATA FOR EXPERIMENTAL AND CONTROL GROUPS

M. I. T.—MALDEN STUDIES IN HEALTH EDUCATION

	Boys		Girls	
	Experimental	Control	Experimental	Control
Number of children	132	107	141	95
	Characteristics October, 1921			
Average age	11.1 yrs.	10.8 yrs.	11.0 yrs.	10.8 yrs.
Average height	55.2 in.	55.3 in.	55.2 in.	55.8 in.
Below average weight *	76%	76%	72%	75%
10% below average weight *	25%	23%	31%	27%
Average relation to Wood weight normal	95.8%	96.0%	96.6%	97.1%
Average weight in pounds	73.5 (±0.7)	74.0 (±1.1)	73.8 (±0.8)	76.3 (±1.3)
	Growth Data			
Expected average gain for 20 months on basis of age alone †	12.7 lbs.	12.4 lbs.	16.3 lbs.	16.1 lbs.
Actual average gain for 20 months	13.52 lbs. (±0.40)	11.13 lbs. (±0.46)	15.31 lbs.	15.10 lbs.
Actual average gain for 20 months in terms of original weight	18.4%	15.1%	20.7%	19.8%
Average gain in height, October, 1921, to June, 1922	1.25 in.	1.00 in.	1.50 in.	1.14 in.
	Underweight Children Only			
Number of children	100	81	102	72
Average weight, October, 1921	70.8 lbs.	70.5 lbs.	70.4 lbs.	71.0 lbs.
Expected gain for 20 months on basis of age alone †	12.9 lbs.	12.3 lbs.	16.6 lbs.	16.0 lbs.
Actual gain for 20 months	13.22 lbs.	11.06 lbs.	14.87 lbs.	14.25 lbs.
Actual gain in terms of original weight	18.6%	15.7%	21.2%	20.1%

* Based upon Wood Tables.
† Based upon Baldwin Averages.

that any superiority in growth which did exist was in favor of those in the control group. They show that the girls in the experimental group had grown distinctly less rapidly than the girls in the control group up to that time. These figures give us further assurance concerning the comparability of the two groups, supplementing as they do our care in selecting them.

The children were weighed at the same time each day and with the lightest indoor clothing.* Such individual variations as would naturally exist in the weight of clothing or ingested food would balance in group averages. Periodically the scales were tested for accuracy. Weights were taken to the nearest quarter pound. The children in

* Georgie B. Collins collected all of the data from the experimental group, and trained the nurse who assisted in the collection of data from children in the control group.

the experimental group were weighed monthly, and those in the control group three times a year.

Height was taken for both groups three times each year. Both height and weight were taken with shoes on. Because of the unpopularity of the removal of shoes, the children were permitted to keep them on, as individual variations were counterbalanced in averages.

In addition to collecting height and weight data, computations were made to show the relationship of each child to average or normal weight. No attempt was made to determine the relative importance of the various habits in which improvement was demonstrated. We were seeking to determine whether the combined effects of health training through the classroom were sufficient to produce differences in the growth rate which were significant and which could not possibly be due to *accidental* variations in the rate of growth of individuals in the two groups studied.

INCREASE IN WEIGHT

The boys with the health education program showed an average gain for the 20 months of the experiment amounting to 13.52 pounds while the boys in the group which did not have the health education had a gain for the corresponding period of 11.13 pounds. The former group gained 18.4 per cent of its original weight, the latter 15.1 per cent of its original weight. The gain in weight of the boys having the health education program exceeded the gain of the boys without health training by 21 per cent.

Table I shows that such slight differences as existed in height, weight, and the percentage of the group seriously underweight, were in favor of the boys in the control group. One notices, however, that the average age of the boys in the experimental group was 0.3 year greater than that for the control group. The expected gain at different ages varies, and one naturally asks whether this difference in the rate of gain may not have been due to an accidental age distribution because of which there were more boys in the experimental group at ages of maximum gain.

In order to determine whether the greater gain in weight may have been due to the age distribution of the group we determined the expected gain on the basis of age alone. Studies of the gains of many thousands of children at different ages have made it possible to prepare tables showing the average or expected gain for boys and for girls at each age level. Such data are given by Baldwin[4] in terms of expected or average gain in ounces per month. By determining the number of boys at each age level for each of the two years of the

study; multiplying the number of boys at each age by the expected gain for that age and adding the product; we get the total expected gain on the basis of age alone for each group. From this we find the expected gain for boys in the experimental group to be 12.7 pounds (on the basis of age alone) and for the boys in the control group 12.4 pounds. Clearly the difference in rate of gain was not due to age distribution. This is further emphasized by the fact that up to the time the study began the boys in the control group had been growing slightly faster than the boys in the health education group.

There remains to be considered the statistical analysis of the data with a consideration of the limits of error. Such a study will tell us whether these differences in average growth are *accidental* differences, due to a statistical population of scattered variants which are overlapping, or whether the differences are so great as to make it certain that they are ***real.***

Chart II shows the distribution of gains in weight by classes for the 20-month period in question. This distribution, like the one shown above, keeps the division of children according to the four weight groups into which they fall. Let us compare the two populations, applying the following commonly used formulae.

$$\sigma = \sqrt{\frac{\Sigma D^2 f}{n}}$$

$$\text{P. E. Av.} = \pm 0.6745 \frac{\sigma}{\sqrt{n}}$$

$$\text{P. E. diff.} = \sqrt{(\text{P. E. Av.}_1)^2 + (\text{P. E. Av.}_2)^2}.$$

Completing these computations, we find group 1 (Health Education) to have a mean of 13.58, with a probable error of ± 0.40. Group 2 (Control) has an average of 11.08, with a probable error of ± 0.463. The probable error of the difference $\sqrt{0.40^2 + 0.463^2}$ is ± 0.612.

$$\frac{\text{Diff.}}{\text{P. E. diff.}} = 4.09.$$

We see that the actual difference between these averages is more than four times the probable error of the difference. We have then a measure of the reliability of this difference. If the difference divided by the probable error of the difference were zero, there would be an even chance or fifty chances in one hundred that the true difference was greater than zero. Under such a condition it would be expected that in a long series of trials half of the experiments would show a superior growth in one group and half in the other. Similarly we find that when the difference is four times the probable error of the difference the "chances in one hundred" are 99.7 that the true difference under the contrasted conditions is greater than zero. In other words,

CHART II

DISTRIBUTION OF GAINS IN WEIGHT BY 3.25 LB. CLASSES — OCT. 1921 - JUNE 1923

		2.50	5.75	9.00	12.25	15.50	18.75	22.00	25.25	28.50	31.75	35.00	38.25	
	GROUP 1		5	14	5	3	3	1	1		1			
EXPERIMENTAL BOYS	GROUP 2		4	28	13	5	5	4	1	7				
No. 132	GROUP 3		6	6	5	4	1	3	1	1	1			
	GROUP 4		1			1	1						1	
	GROUP 5	1	4	10	10	10	8	1						
EXPERIMENTAL GIRLS	GROUP 6	1	2	10	8	11	12	6	5	3				
NO. 141	GROUP 7	1	2	7	4	4	7	4	3	1				
	GROUP 8				2	1	1			1			1	

		24.25	1.75	5.00	8.25	11.50	14.75	18.00	21.25	24.50	27.75	31.00	34.25	37.50	39.25
	GROUP 1	1		7	10	3	2	3		1					
CONTROL BOYS	GROUP 2			13	17	15	4	3	1	1	1	1			
No 107	GROUP 3				8	8	2		1			1		1	
	GROUP 4	1					1			2				1	
	GROUP 5			3	1	7	6	6	3						
CONTROL GIRLS	GROUP 6		4	2	6	10	10	5	4	1	2	1			1
NO 95	GROUP 7		1	1	3	2	1	2		1	3				1
	GROUP 8			1	1		2	1		1		1			1

in this case the actual difference is enough greater than the probable error to indicate complete reliability.

It may be noted that one boy in the control group actually lost weight instead of gaining over the period of this experiment. This was not because of illness. Because the case was unusual, however, it was desired to see whether it would affect the general results. Consequently that case was dropped from the list, and complete computations were made once more for the 106 boys remaining in the control group. These computations showed an actual difference of 3.8 times the probable error of the difference, or 99.5 chances in one hundred that a real difference exists.

Comparison of the figures in Table I will show that the data for the *underweight* boys considered separately are essentially similar to the data for the group as a whole.

The comparison between the weight increases of the two groups of girls is no less significant but very different in nature. The two groups of boys were alike, but the boys with health education made an appreciably better gain. In the case of the girls those having health education, although smaller and biologically inferior, gained slightly more in weight than did the larger and superior girls in the control group.

The girls in the control group were slightly nearer to normal weight than the girls in the experimental group. They averaged 0.6 inch taller, and 2½ pounds heavier. Thus, although they were a trifle younger and would have been expected to be slightly smaller, they

were in reality appreciably taller and heavier and slightly nearer to normal weight. Their growth rate in both height and weight had, therefore, been more rapid than that of the girls in the experimental group up to the time this experiment began.

The average gain in weight for girls in the experimental group was 15.31 pounds for the 20-month period; and for the girls in the control group the average gain was 15.10 pounds. The difference between these gains is not appreciable. The significant fact is that the smaller girls in the health education group gained as much as the larger girls in the control group.

The computation of expected gain on the basis of age alone (experimental 16.29 pounds; control 16.10 pounds) shows a similar expected gain for the two groups on the basis of age distribution. We find that the girls in the health education group gained 20.7 per cent of their original weight and the girls in the control group gained 19.8 per cent of their original weight.

As will be seen by reference to Table I, the comparative results from the underweight girls *only* are similar to those from the group as a whole.

GROWTH IN HEIGHT

Because of an unfortunate error which was not noted until too late, data for height failed to be taken for one section of the control group during the second school year of the study. We are able, however, (1) to compare the growth in height for the two groups during the *first* year, and (2) to compare the growth in height for the health education children for the 20-month period with the expected standards.

Comparing the growth of both boys and girls in the experimental and control groups for the period October, 1921, to June, 1922, we find that the children in the health education group gained 1.375 inches and the children in the control group 1.062 inches. Computing the expected gain on the basis of age, according to the plan outlined above we find that the expected gain for the children in the experimental group was 1.37 inches and for the children in the control group 1.39 inches. Actually the children having health education gained in height 28 per cent more than the children who did not have health education. Statistical computations for the two groups, like those indicated in the above section on weight, show that the actual difference in average gain between the two groups was 8.8 times the probable error of the difference

$$\frac{\text{Diff.}}{\text{P. E. Diff.}} = 8.8.$$

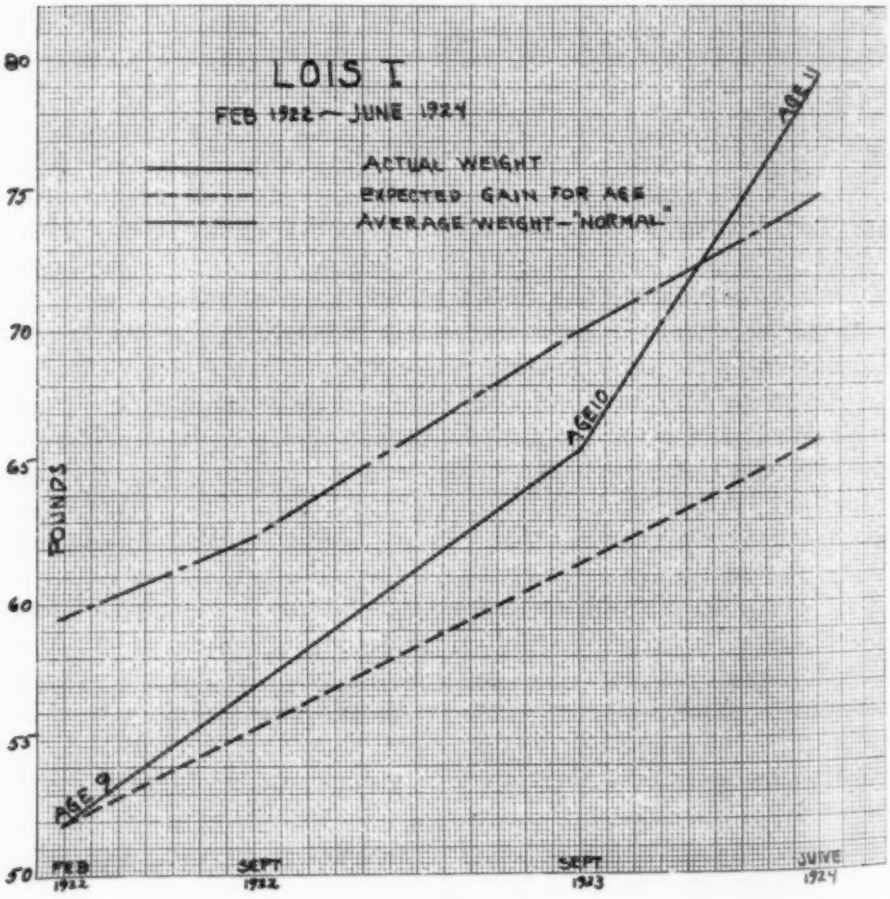
Comparing the growth in height for the children in the health education group over the 20-month period with the expected gain on the basis of age, we find that the actual gain was 2.25 inches and the expected gain was 2.05 inches. The actual gain was, therefore, 9 per cent greater than the expected gain.

The comparable increase in growth rate in both height and weight shown by the health education group is further borne out by the following data on the relationship of these two groups to normal weight.

RELATION TO "NORMAL" OR AVERAGE WEIGHT

We have heard much about underweight among school children, and many public school systems have come to use extensively the figure of percentage normal weight. This figure is the actual weight of the child expressed as a percentage of the average weight for chil-

GRAPH I



dren of its height, age, and sex. From the literature on child health one might naturally look for the success of a school health-training program to be measured by a reduction in the number of underweight children or an approach of the average normal weight toward 100 per cent. Our figures do not show such a change. They indicate an increase in the rate of growth in both height and weight, but not a fundamental change of body proportions.

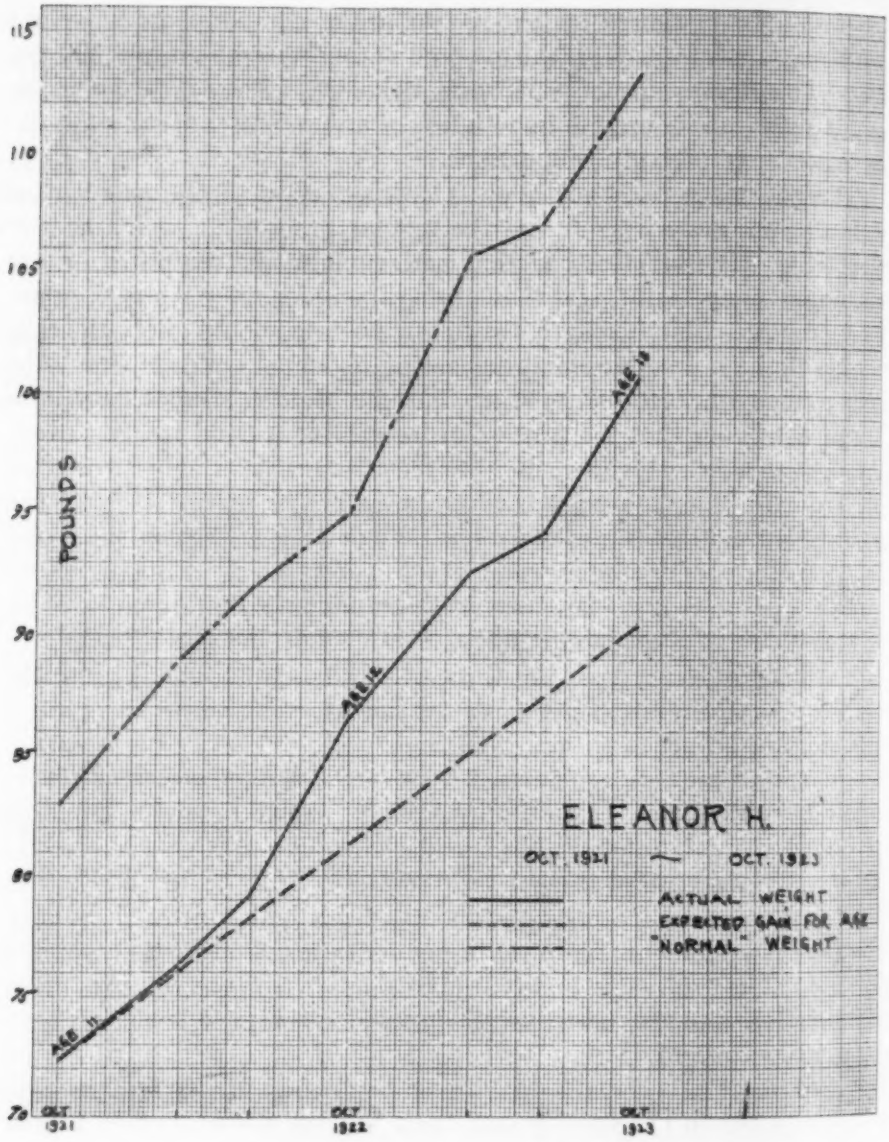
Present space does not allow a consideration of the problem of malnutrition, underweight, and the regular program of weighing and measuring. It is understood that underweight and malnutrition are not synonymous terms, and that often difficulties arise when they are used as such. Lest, however, the following data should imply the conclusion that the weighing and measuring of school children should be done away with, we wish to state that the Malden studies have confirmed our belief that the process of interesting a child in his growth, through regular weighing, is the most valuable single procedure in motivating him toward the adoption of health habits. This is an educational not a clinical process. Underweight figures are useful clinically when properly interpreted and applied. Consistency of growth is also an important and valuable index. Failure to increase in weight during a single month is not significant, but loss of weight or failure to gain over a period of three or more months should cause the teacher to call the attention of the physician or nurse to the child to see whether he needs special attention.

Several of the children studied came out of the underweight group. Many individual charts like that of Lois T., shown herewith, could be produced. Many other children had charts like that of Eleanor H., showing an increase in weight in excess of that expected at the age level, and an unexpectedly rapid increase in height which still left the child underweight. Eleanor was a slender type child who grew rapidly but maintained the same bodily proportions. At the same time, other children fell into the underweight group from higher levels of "per cent normal weight."

Each child's "normal" weight, or percentage of average weight, was computed in October, March, and June of the first year, and at similar dates for the second year, in the case of the experimental group. The absence of height data for part of the control group during the second year made impossible the computation of average weight percentages.

One of the first things to note is a seasonal variation in underweight. In June, 1922, 9 of the children who were in the 10 per cent underweight group the preceding October, had come out of that group,

GRAPH II



but 17 children who were not 10 per cent underweight in October had dropped into the 10 per cent underweight group. Similarly in the control group, 11 children came out of the underweight group during the school year, but 19 children dropped into the underweight group. In both the experimental and control groups we find, therefore, 8 more children in the 10 per cent underweight group in June than in October.

Table II shows the average percentage normal of groups 1 to 8 in both experimental and control children during the school year 1921–1922. While these changes are not consistent it will be noted that the average per cent normal is lower in June than in October, and we shall see later that this seasonal fluctuation is greater than the fluctuation from one year to another.

TABLE II

AVERAGE PER CENT NORMALS—1921-22

Group Number and Number of Children in Group		October		March		June	
Expt.	Contr.	Expt.	Contr.	Expt.	Contr.	Expt.	Contr.
BOYS							
(1) 33	25	86.72	86.51	87.86	87.43	86.40	86.71
(2) 67	56	95.01	94.83	95.81	94.79	94.17	93.25
(3) 28	22	104.70	103.83	104.77	102.31	102.72	101.13
(4) 4	4	123.65	128.55	125.55	129.55	124.10	126.97
GIRLS							
(5) 44	26	85.38	84.50	86.12	85.58	84.37	85.00
(6) 58	46	94.66	95.18	94.53	95.46	92.88	94.29
(7) 33	15	107.93	105.00	108.75	105.10	107.57	105.17
(8) 6	8	136.00	134.41	133.31	132.48	132.75	130.81

In October, 1922, 17 of the 77 underweight health education children were out of the 10 per cent underweight group, but 5 who were not in the group at the beginning had dropped back into it. Comparing one October with the next, then, we have a reduction of the number of 10 per cent underweight children from 77 to 65. This is not significant, however, for, by reference to individual records, it is seen that several of the children who have gone out of the 10 per cent underweight group have not gone very far above the 90 per cent figure. Comparing one June with the next we find 85 children in the underweight group in 1922, and 88 children in the underweight group in 1923.

A study of individual children shows a continuous plus and minus variation in the child's relationship to normal at succeeding weighing

and measuring periods, due to the roughness of the measure and the inexactness of the method of determining this figure; but our data do not present significant evidence of a reduction in the number of underweight children. A similar situation is found when we deal with small groups like an individual class of boys or girls. When we combine the "per cent normal" figures for a large number of children who are individually varying in both plus and minus directions from time to time, the average tends to remain constant.

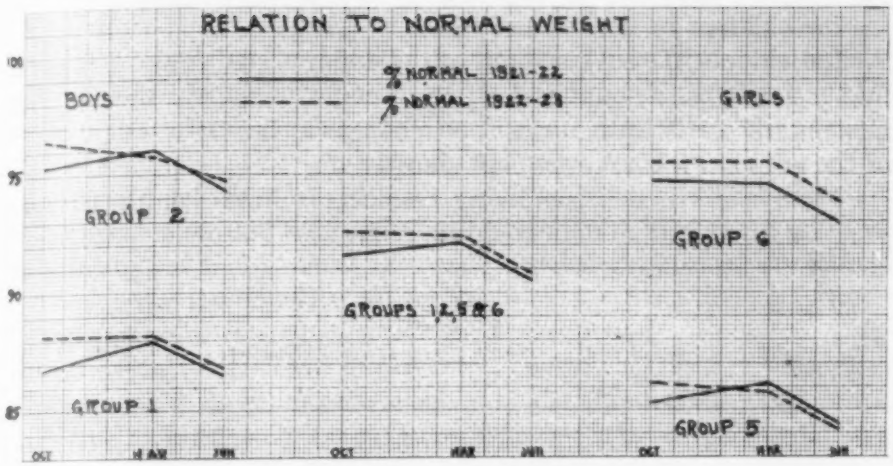
Table II does not show a significant change in the percentage of underweight when experimental group children are compared with control group children. In Graph III for Health Education Children, shown herewith, group 1 (boys more than 10 per cent underweight), group 2 (boys from 1 to 10 per cent underweight), group 5 (girls more than 10 per cent underweight), and group 6 (girls from 1 to 10 per cent underweight) are compared during the two years of the study. The averages for *all* underweight health education children were combined in the curves shown at the center of the graph. It will be seen that this group of children who were underweight in October, 1921, were slightly nearer normal during the school year 1922–1923 than during the school year 1921–1922. The seasonal variation, however, is greater than the difference between the two years.

When we make a statistical analysis of the figures, moreover, we find that they are not significant. The statistical analysis of the figures for March, 1923, and for March, 1922, shows the average percentage normal for 202 children in the control group in March, 1923, to be 92.222, while the average for the same children in March, 1922, was 92.037. The difference of these averages is 0.18. The probable error of the average for 1923 is $\pm$ 0.31 and the probable error for the 1922 average is $\pm$ 0.26. The probable error of the difference is $\pm$ 0.404 while the difference itself is only 0.18. No significance statistically, therefore, can be attached to this finding.

By comparing the averages for the two October computations we find their difference to be 1.08 and similar data for the two June studies show the difference to be 0.36. Since the average per cent normal figures remain essentially the same, the probable error of the difference between these last mentioned figures would not be greatly different from that computed ($\pm$ 0.404). We see, therefore, that, although the underweight children having a health education program average slightly nearer normal weight during the second year than during the first year, the difference is not great enough to be significant when the usual statistical measurements are applied.

The whole picture needs to be kept in mind in this connection.

GRAPH III



We found upon inquiry in February, 1925, that 23 of the 77 children who were 10 per cent underweight at the beginning of the study were left in our schools. The rest had moved away. Of these 23 children, 10 were still in the 10 per cent underweight group (9 girls and 1 boy). Figures like these when quoted by themselves make it seem that the health program may greatly reduce the number of underweight children. When, however, one looks at the wide fluctuations in percentage normal for individual children over succeeding years, when one sees that the size of the group stays about the same, when he contemplates the lack of precision in computing the percentage normal figure in the first place, and when he applies actual statistical methods to such figures as those we have obtained, he cannot conclude that health education will do away with the group of underweight children.

Specific studies have been made upon the significance and limitations of the underweight figure as applied to the individual child and as applied to the group. Space does not permit reporting them here.

SUMMARY AND CONCLUSIONS

Growth records were carefully and accurately taken over a period of 20 months from 273 children under the influence of a reasonably intensive health education program and from 202 children in a comparable control group who continued in the usual school program without any special training in health beyond that previously given. The health education program proved to be a sound, practicable and acceptable public school procedure. Definite improvement in health habits was shown.

The rate of gain in both height and weight for the children receiving health education was measurably and significantly greater than for the children in the control group.

Individual children came out of the underweight group. Seasonal fluctuation in the amount and extent of underweight was shown. Significant and statistically measurable changes in the underweight status of the group as a whole were not shown.

More healthful habits of living, resulting from the health education program, produced an improved rate of growth, but not a fundamental change in the height-weight ratio.

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NOTE: All original data for the study here reported are on file in the library of the Massachusetts Institute of Technology.

Public Health Training in Great Britain

IN a recent issue of the *Medical Officer* the history of public health training by universities and medical schools of the British Isles is given. The University of Edinburgh was the first medical school in Great Britain to institute a degree of public health, and the first graduation of sanitarians was in 1875. That same year the University of Cambridge established the conditions for the award of a diploma in public health. As early as 1874 the Senate of the University of London passed a resolution that a certificate in public health should be awarded, and in October, 1888, it resolved that a degree of M.D. in State Medicine should be instituted. The Royal College of Physicians, London, first granted a certificate in hygiene in 1885 and two years later this was changed to a diploma, granted jointly by the Royal College of Physicians and the Royal College of Surgeons of England. The University of Aberdeen conferred its first diploma in public health in 1887 and the joint faculties of the Royal College of Surgeons and Physicians of Glasgow in 1890. Oxford University conferred its first public health diploma in 1898. The University of Glasgow instituted the degrees of B.Sc. and D.Sc. in public health in 1903, but it was not until 1905 that the B.Sc. degree was granted and the first D.Sc. degree in 1912.

The graduate in medicine from the University of Edinburgh has to specialize more or less for a period of two years before he can enter for the final B.Sc. degree and a period of five years must elapse before he enters for the D.Sc. degree in public health.

During recent years many women graduates from medical colleges have entered the public health service.

A Fallacy in the Standard Methods of Examining Disinfectants

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THE three most commonly used tests for determining the germicidal efficiency of disinfectants are the Hygienic Laboratory,[1] the Rideal Walker,[2] and a modification of the Rideal Walker method,[3] employed in the Regulatory Branch of the U. S. Department of Agriculture. In all these tests, a loopful of disinfectant, containing the test organism, is transferred to broth and the survival of the organism determined by noting the appearance of turbidity in 48 hours. In the Rideal Walker method, a 3 mm. loop is transferred to 5 c.c. of broth. In the others, a 4 mm. loop is transferred to 10 c.c. of broth. So, in all cases, a certain amount of disinfectant exists in the broth and, should the quantity be large enough to inhibit growth, a false reading will result.

Usually, this condition does not occur. For the loop carries over very little disinfectant. Thus, Abbott[4] calculated that the loop used by him averaged 2,000 to the c.c. and that one loopful of a 1–1,000 dilution of corrosive sublimate made a final concentration of 1–20,000,000 when transferred to 10 c.c. of broth. Churchman[5] stated one 2 mm. loop in 7 c.c. of broth made a dilution of 1–70,000.

And, from this data, one might conclude by means of the pi. r. square formula, that the 4 mm. loop, used in the Hygienic Laboratory and Department of Agriculture methods, should equal a dilution of about 1–25,000 and the 3 mm. loop, employed by the Rideal Walker test, should make, approximately, a 1–22,000 concentration. For practical bacteriostatic work, the two dilutions would be equivalent.

But, unfortunately, other factors modify this calculation and the caliber of the wire, the manner of making the loop and the thickness of the film of liquid will cause a very large variation. Two 4 mm. loops, fashioned by two separate individuals in this laboratory, measured, respectively, 130 and 170 to the c.c. and a conservative estimate would put the dilution, produced by adding the standard 4 mm. loop to 10 c.c. of broth, at not greater than 1–2,000. Even so, when we apply these figures to phenol in the solution of 1–60, commonly used against *M. aureus*, it is evident that the dilution of 1–120,000, obtained by adding one 4 mm. loop to 10 c.c. of broth, would be far too weak to have any effect.

However, phenol, although a reliable germicide, has little bacteriostatic power. Especially is this true when it is employed against *M. aureus*, the coccus that is employed to test the efficiency of products designed to disinfect wounds. It is possible to grow the strain which can be obtained from the Department of Agriculture in a dilution of 1–300 phenol and, in consequence, it is obvious that the phenol, supposedly acting as a control, could not inhibit the growth of *M. aureus* in the dilution mentioned.

But, in contrast to this weak bacteriostatic action, Abbott demonstrated that corrosive sublimate suppressed growth of this organism in peptone broth in 1–75,000 dilution and, when the broth was made without peptone, in a dilution of 1–200,000. Its germicidal power was comparatively weak, as it failed to kill *M. aureus* in 1–1,000 dilution in 20 minutes. And the author, uniformly, has obtained some bacteriostatic action in dilutions of over 1–100,000, using the broth specified in the method of the Department of Agriculture.

Now, these results are produced by transferring a 4 mm. loop or about 1/200 c.c. of a vigorous, 24-hour culture to broth containing bichloride. But, in the test, the culture first is diluted by adding 0.5 c.c. of culture to 5.0 c.c. of disinfectant, or a concentration of 1–10, so that only 1/2,000 of a c.c. is transferred and the organisms are no longer vigorous, since they have undergone treatment, for from 5 to 15 minutes, with bichloride. The fewer the number of organisms transferred and the greater their attenuation, the greater will be the bacteriostatic action of the bichloride and thus it may be expected to act in far higher dilutions, probably in one to several millions.

In order to overcome this source of error, a simple modification of the regular tests was performed. Four loops were transferred from each of the broth preparations to fresh tubes of this medium, the dilution of bichloride in the latter, thereby, being rendered infinitesimal.

TABLE I

Dilution of Bichloride	Time of Exposure in Minutes		
	5	*10*	*15*
1-100	0	0	0
Transfers 1-100	X	0	0
1-500	0	0	0
Transfers 1-500	X	X	X
1-1,000	X	X	0
Transfers 1-1,000	X	X	X
Dilution of Phenol			
1-60	X	X	0
Transfers 1-60	X	0	0
1-70	X	X	X
Transfers 1-70	X	X	X

With this modification, the efficiency of bichloride was determined by the Department of Agriculture method, at a temperature of 20° C., against *M. aureus* as test organism, with the result seen in Table I.

This experiment indicated that the method is misleading when used to determine the germicidal efficiency of mercuric chloride against *M. aureus*, for, when no sub-transfers were made, the substance appeared to kill the coccus in 1–1,000 dilution in 15 minutes, while, on the contrary, growth in the sub-transfers showed that the organism really survived after treatment for 15 minutes with a 1–500 solution.

At the same time, it should be noted that the phenol control failed to kill *M. aureus* in a 1–60 dilution in 10 minutes, although no turbidity arose in the sub-transfers after 5 minutes. This result we should expect in the case of a germicide having little bacteriostatic ac-

TABLE II

Dilution of Bichloride	Time of Exposure in Minutes		
	5	*10*	*15*
Department strain			
1-100	0	0	0
Transfers 1-100	X	0	0
1-200	0	0	0
Transfers 1-200	X	X	X
1-300	0	0	0
Transfers 1-300	X	X	X
1-400	0	0	0
Transfers 1-400	X	X	X
1-500	0	0	0
Transfers 1-500	X	X	X
Dilution of Phenol			
1-60	X	0	0
1-70	X	X	X
Strain "L"			
Dilution of Bichloride			
1-100	0	0	0
Transfers 1-100	0	0	0
1-200	0	0	0
Transfers 1-200	X	X	0
1-300	0	0	0
Transfers 1-300	X	X	X
Dilution of Phenol			
1-60	0	0	0
1-70	X	X	X
Strain "P"			
Dilution of Bichloride			
1-100	0	0	0
Transfers 1-100	X	0	0
1-200	0	0	0
Transfers 1-200	X	X	X
1-300	0	0	0
Transfers 1-300	X	X	X
Dilution of Phenol			
1-60	0	0	0
1-70	X	X	0

tion, for, here, the smaller number of organisms in the second set of tubes would tend to make the reading higher in the first set, in which the small amount of phenol present would have no power of inhibition.

The finding in regard to bichloride was confirmed on several occasions. Five strains acted alike and survived a 1–500 dilution for 15 minutes and, finally, the Department of Agriculture strain and two others, freshly isolated from human infections, were tested against solutions, ranging from 1–100 to 1–500, with result shown in Table II.

Apparently, mercuric chloride does not always kill *M. aureus* in 1 per cent dilution in 5 minutes, nor in ½ per cent dilution in 15 minutes, although its bacteriostatic action, which is not eliminated by the unmodified method, will make it seem to kill in very much weaker concentrations. This source of error was found to apply to other preparations, mercurial and non-mercurial, possessing great inhibitory power. Table III gives the result of a test made on a sample of gentian violet.

TABLE III

Gentian Violet Dilution	Time of Exposure in Minutes		
	5	*10*	*15*
1-10	0	0	0
Transfers 1-10	X	X	X
1-100	0	0	0
Transfers 1-100	X	X	X
1-1,000	X	X	X
Transfers 1-1,000	X	X	X
Phenol Dilution 1-60	X	0	0

Here, the unmodified method indicated that gentian violet kills *M. aureus* in at least a 1 per cent concentration, in 5 minutes, while the sub-transfers proved that the organism survived a 10 per cent solution for 15 minutes.

Conclusions—The method for testing germicides, employed in the Department of Agriculture, is not applicable to preparations with high bacteriostatic power, unless modified by the addition of sub-transfers.

There is no reason to believe that the Rideal Walker and Hygienic Laboratory methods would give more accurate results.

Mercuric chloride fails to kill *M. aureus* at 20° C. in dilutions of 1–200 to 1–300 in 15 minutes.

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How Bridgeport Reduced Its Infant Mortality

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WHEN in 1918 the slogan "Save a hundred thousand babies" was promulgated, the City of Bridgeport, Conn., was among the first to take up the call. Looking back at an infant mortality rate of 109 for the 5 years, 1911–1915, and noting the number of deaths from gastrointestinal diseases, particularly during the summer months, the nurses of the local Visiting Nurses Association and four nurses from the Department of Health visited as many babies as possible during the summers of 1918 and 1919 in an attempt to reduce the number of infant deaths from that cause.

To be sure, this was a sporadic effort, but during the 3 years, 1918–1920, the work was further systematized with the opening of a milk station and summer well baby stations. The latter were well attended at first, but it soon became apparent that to make the fullest use of them it would be necessary to have a physician in attendance, as the number of visits fell off rapidly when the mothers found no doctor there to advise them. During this period the rate fell from 99.5 in 1918 to 92.1 in 1920, with a marked decrease in the deaths during the summer months.

Bridgeport is almost exclusively a manufacturing city. In 1920 it had a population of 144,000, of whom one-third were foreign born, with Italians, Poles, and Hungarians predominating in that group. The midwife did practically all of the obstetrical work among these women, attending as a matter of fact over one-third of the deliveries in the city.

At the beginning of 1921 the Department of Health definitely took over the infant welfare work with the avowed purpose of further reducing the infant mortality. The question then arose as to what might be the best method of establishing contact with the mothers and of following the babies through their first year of life.

The health officer in Bridgeport is the registrar of vital statistics. It was decided to have nurses from the department deliver birth certificates to the mothers as soon as possible after the registration of

births. To this end the city was divided into districts, with a nurse in each; well baby stations or, as they are called in Bridgeport, health stations, were opened in school buildings in different parts of the city. There are 5 stations today. Four are open one afternoon a week and another in a densely populated Italian district two afternoons a week. There is a doctor in attendance at each station.

At the outset the personnel of the newly organized division of infant welfare consisted of a director, a supervisor, 8 nurses and a clerk. The nurses in addition to performing the duties connected with the infant welfare program also did the communicable disease work. At no time have the nurses done infant work alone.

As time went on, a separate group of nurses was employed for communicable disease activities and the infant welfare and medical school inspection divisions were merged. That is how the organization is maintained at present.

Today the division is made up of a director, 2 supervisors—1 for each activity—22 nurses and 2 clerks. The city has been divided into 20 districts with a nurse in each. The nurse is responsible for all the child hygiene work in her territory, including that for the infant, the preschool and the school child. For the outlying districts an automobile is provided. The 2 remaining nurses are for relief.

During the school term the nurses spend the mornings in the schools and the afternoons in the field making such school home calls as are necessary, following up the infants, or are in the health stations. During the summer months, they are not engaged in infant work alone, but carry on any special activity that may be undertaken. For some years extra health stations for preschool children were opened during the summer months, but for the last two years this time has been used to a great extent in a toxin-antitoxin and Schick testing campaign.

Since the beginning, the main idea has been to get the coöperation of the mothers. When the nurse delivers the birth certificate to the mother she at the same visit gives the first of a series of 12 monthly letters. She explains the purpose of the infant welfare work, tells of the health stations, and talks over the general care of the baby.

The letters of the series are very simple. They are dated "Baby's First Month," and so on, up to the 12th month. They tell of certain common dangers to and certain common measures for the baby's health, what the mother may expect of the average child at different times, and urge her to seek advice from the family doctor at once when anything unusual develops in the infant's condition.

At the health stations the babies are weighed and measured. The doctor in attendance examines those brought to him, supervises feed-

ing, and prescribes for minor ailments. Physicians' private patients are referred back by the nurse. Children found ill are sent to their own doctor or to such agency as the doctor may think best suited to care for those particular children. The importance of breast feeding is emphasized and premature or unnecessary weaning is often prevented. Attempts are made to bring home the idea of keeping the baby well.

This work has now been carried on for 7 years. What has been accomplished?

To be sure there had been a downward trend in the infant mortality rate before the Department of Health made any special effort to lower it. The average rate from 1911 to 1915 was 109. From 1916 to 1920 it was 93.1. For the year 1920 it was 92.1. Since the department began the work the rate has not been above 80. The average rate for the last 7 years is 63.3. For 1927 it was 42.5, the lowest ever recorded for the city. Had that for 1927 been the same as 1920 there would have been 288 deaths in that year instead of 133.

TABLE I

DEATHS PER 1,000 BIRTHS FROM THE FIVE PRINCIPAL CAUSES

	1920	1921	1922	1923	1924	1925	1926	1927
Prematurity	18.9	13.1	11.4	11.7	15.2	12.4	17.3	12.4
Respiratory Diseases	18.9	10.2	13.5	15.3	10.0	10.1	13.7	6.0
Congenital Malformations	10.2	6.8	5.8	8.2	4.5	6.4	4.2	3.5
Birth Injuries	5.2	5.8	3.5	8.8	4.8	7.6	6.5	4.4
Enteritis	16.9	9.9	5.8	3.0	2.4	3.5	4.2	0.9
Infant Deaths	385	271	220	261	183	164	223	133
Births	4178	4116	3406	3265	3282	3063	3055	3123
Infant Mortality Rate	92.1	65.8	64.5	79.9	55.7	53.5	79.2	42.5

It will be seen that there was a rise in 1923 to 79.9 and that there was in that year a rise in the rates for prematurity and the respiratory diseases. Respiratory complications accompanying or following measles were the cause of 20 infant deaths. The rate for prematurity was the highest since 1920.

Again in 1926 there was a rise to 79.2, almost as high as in 1923, and once more there was a rise in the rates for prematurity and the respiratory diseases. In 1927 with the lowest rate in the history of the city there was a drop in the rate for prematurity and a surprising drop in that for the respiratory diseases.

In Bridgeport the gastrointestinal diseases as causes of death are almost negligible, due in large measure to the fact that 95 per cent of the milk sold in the city is pasteurized. Prematurity and the respiratory diseases remain the two principal causes of infant deaths.

Just how the respiratory disease rate can be lowered is a, or the, question. The nurses in their visits stress the importance of guarding

against and promptly treating colds. There may be no satisfactory treatment for a cold, but mothers can understand that rest in bed and forcing fluids may do something to prevent the development of a more serious respiratory complication. Mothers are urged to call the doctor early in these cases and every endeavor is made to educate them to a realization of the fact that the common cold is a source of danger.

Statistics alone may not be a satisfactory index of the quality of the work done, but the number of calls gives a good idea.

Infant welfare calls were as follows: 1921, 18,412; 1922, 41,971; 1923, 50,079; 1924, 60,876; 1925, 57,247; 1926, 52,333; and 1927, 62,024.

From the beginning, the health stations have been well attended. During the entire time over 30 per cent of the babies born and residing in the city have been registered at these stations. The attendance and new registration is shown in Table II.

TABLE II

HEALTH STATION ATTENDANCE

	Total	Under 1 Year	New Registration under 1 Year
1921	6,258	4,824	
1922	7,107	5,020	1,028
1923	7,422	4,813	972
1924	7,560	5,156	975
1925	8,833	6,355	985
1926	6,930	4,876	747
1927	9,280	6,079	876

The budget for the Division of Child Hygiene in 1927 was $41,340.00. Taking one-half for infant welfare work gives that branch $20,670.00, which makes the cost of keeping in touch with the baby at home and at the Health Stations 28.9 cents per visit. This figure has been made possible by eliminating special nurses for the different phases of child hygiene work and having each do her part in the program as a whole.

SUMMARY

The Department of Health of Bridgeport has been trying to reduce the infant mortality rate for the last 7 years. It started this undertaking with a corps of 9 nurses, and today employs 22. Only a part of their time is devoted to this work. During this period the rate has fallen from 92.1 in 1920 to 42.5 in 1927, with rises to 79.9 in 1923 and to 79.2 in 1926, attributable to increases in the deaths from respiratory diseases. These and prematurity are the outstanding causes of infant mortality, and for further reduction special endeavors must be made in this direction. The cost of following up an infant in 1927 was 28.9 cents per visit.

Diphtheria, Its Treatment and Prevention

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A STUDY of diphtheria mortality during the past half century in the states, provinces and cities of the United States, Canada and Europe was made to learn:

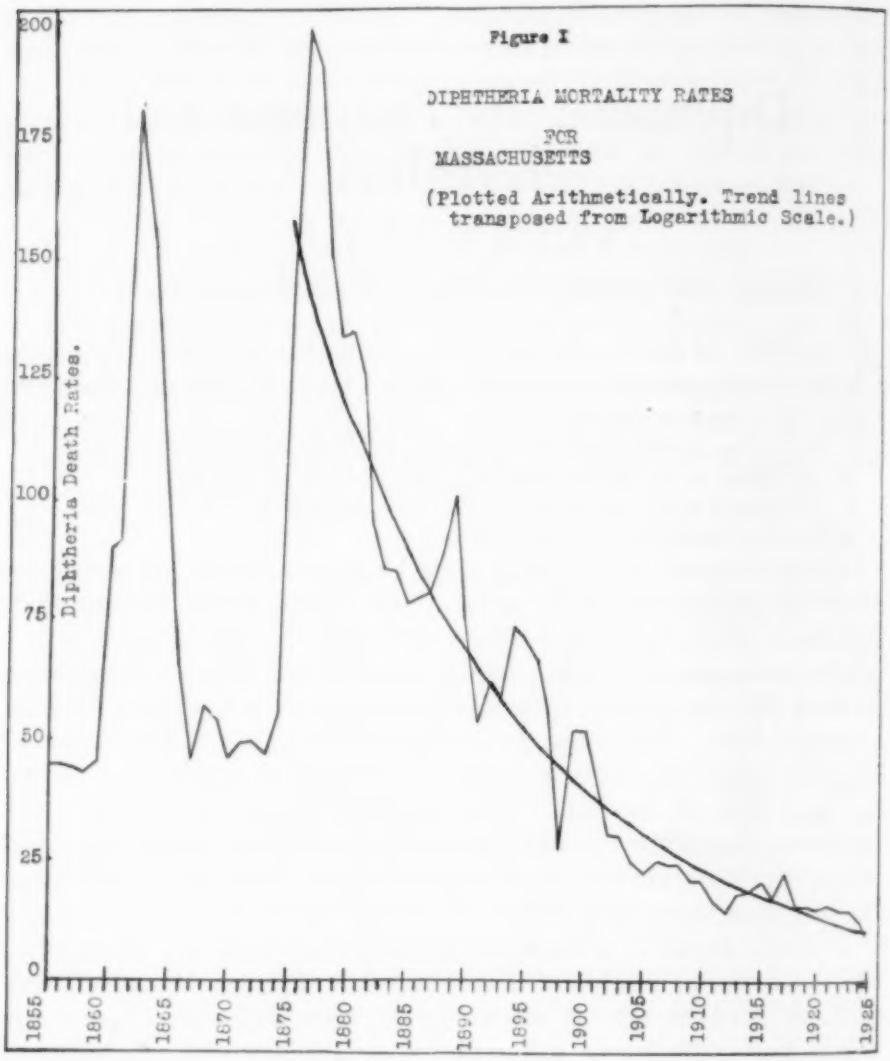
1. The extent of diphtheria mortality and its variation from year to year
2. The effect on diphtheria mortality due to the use of antitoxin
3. The extent of the use of diphtheria immunization
4. Its effect on diphtheria mortality

For the purpose of this study, data have been plotted on semi-logarithmic paper in order to demonstrate the trends in the various data. Diphtheria death rates, in common with many biological data of progressing or regressing events, follow a curvilinear trend, so that when the same data are plotted on semi-logarithmic paper the trend becomes a straight line. Therefore, semi-logarithmic paper is the paper of choice, or plain cross-section paper may be used on which one can plot the logarithms of the data. The resulting graphs will be identical. Diphtheria mortality rates for Massachusetts, plotted on plain cross-section paper, Figure I as numbers, and Figure II as the logarithms of the data, illustrate this point.

It is now about 33 years since diphtheria antitoxin was given to the world as a specific treatment for diphtheria. Prior to 1895, the crude death rate from diphtheria was around 100 per year with a wide range of variation, differing in different communities; physicians watched with dread, and were helpless to combat the rapid and fatal course of this disease. But with the introduction of antitoxin, the scene was changed. Men who had many times stood helplessly by and beaten, now, by the aid of this wonderful new specific, were able to treat with success. They watched with justifiable pride the rapid clearing of the membrane and dramatic recovery of the patient.

Hospitals saw their diphtheria mortality rates cut in two, following the introduction of antitoxin, and apparently a new day had dawned in which diphtheria, the great scourge of pediatrics, was to be laid low and fade off into history as an awful nightmare.

Since 1895, the use of diphtheria antitoxin as a therapeutic agent

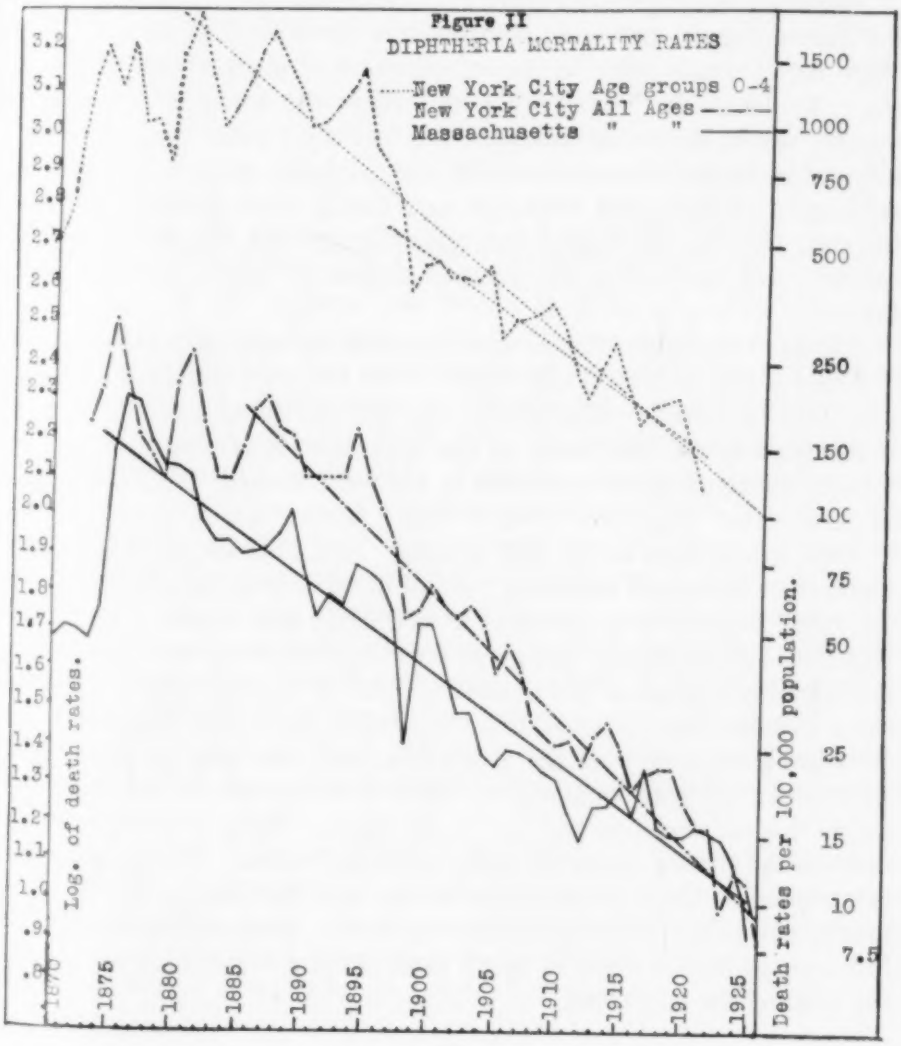


has become practically universal. It was rapidly adopted by the profession and accepted by the laity. Year by year cases were seen, diagnosed and treated earlier, and with larger doses of serum, and yet diphtheria is with us still and is one of the chief causes of death from acute infections in childhood. We often point with pride to our declining mortality rates and show how we are conquering diphtheria. Occasionally when we get a run of luck and find a series of years showing a marked downward slope in mortality rates, we get quite beside ourselves in our enthusiasm over how we are bringing down our diphtheria mortality.

Now after a period of 33 years of experience with the use of anti-

toxin let us pause and look back over our trail and consider whether we have taken full advantage of the opportunity afforded by so potent a drug as antitoxin. Is diphtheria as thoroughly beaten as we had reason to expect 33 years ago? If not, then, why not? What have we done to eradicate diphtheria since the introduction of active immunization? Have we made the most of our opportunities in that respect? If not, why not?

In a paper read before the National Academy of Science, November 9, 1926, Doering showed that diphtheria rates in Massachusetts from 1875 to 1925 fall about a trend line within the range of chance distribution, and the trend is certainly not markedly changed in direction when passing through the period following 1895.



What Doering found to be true for Massachusetts is also true, in a general way, for other countries, states and cities. If data showing diphtheria mortality rates extending back to 1870 or further, for large communities, are plotted, one can see that there are two general trends. The first, in respect to time, can be drawn forward and is found to leave the course of mortality-rate-frequencies somewhere between 1890 and 1900. On the other hand, a trend line can be drawn, starting at 1925 and drawing it backward, which will not leave the course of mortality frequencies until about the year 1880 or 1890. In no instance do the data of diphtheria mortality rates show a marked drop in their trend when passing into the range of influence of the therapeutic use of diphtheria antitoxin.

Observe the graphs in Figure II. Note that the trend of the data for Massachusetts has been continuously downward at an unvarying slope for 20 years prior to the introduction of antitoxin in 1895 and since, to date. In New York City, where the factor of population density would obviously influence the mortality rates from any communicable disease, the tendency for the mortality rates to fall was not noticeably marked until 1894, but note that a trend line can be drawn in from 1885 to 1925, and throughout its extent the mortality frequencies fall well within the range of chance deviation from the trend line.

Observe the upper dotted line representing mortality rates for the 0–4 age group in New York City. Two lines are drawn in showing two possible trends. The shorter line fits the data more closely and, if accepted as the true trend of the data, then it is apparent that the introduction and use of antitoxin in 1895 was responsible for the drop in death rates from 1894 to 1898 which was relatively greater in the 0–4 age group than in the city at large. On the other hand, with an increase in the use of antitoxin the fall in rates from 1898 to 1921 was less rapid in the 0–4 age group than in the city as a whole. The writer believes that the longer line gives a more accurate picture of the general trend of the fall of the mortality rates in this age group. In only three instances do the mortality frequencies vary more than twice the standard deviation from the trend line, and that only prior to 1900, since when diphtheria mortality rates have tended to become more stable due no doubt to the use of antitoxin. Such a trend conforms more to the general trends in other states and cities. If the longer line is accepted as the probable trend of the data for this group, then one must concede that although, without a doubt, antitoxin has been a real influence in the lowering of death rates there are other factors operating toward the same end.

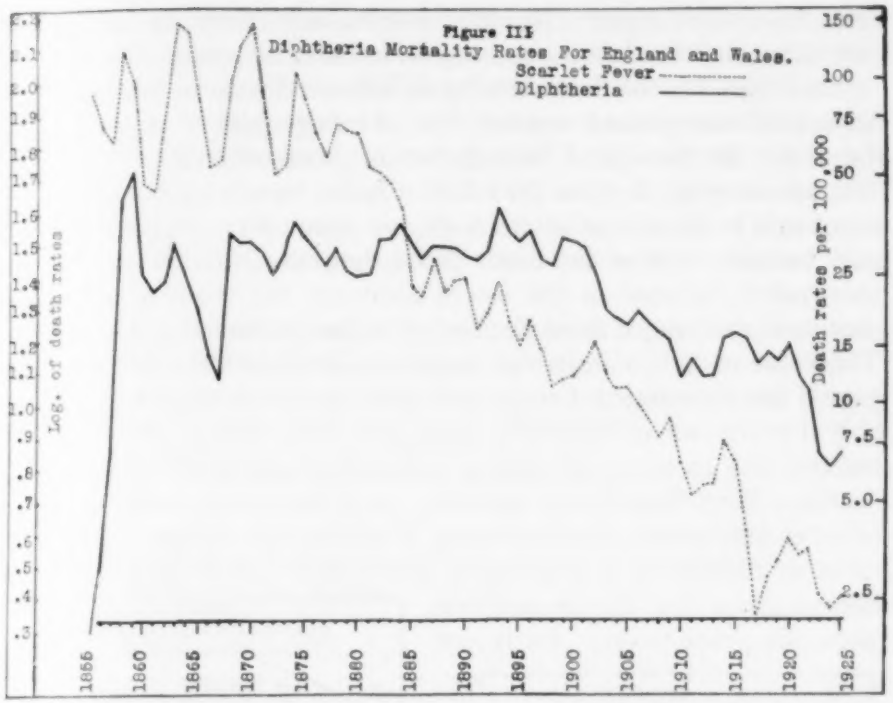
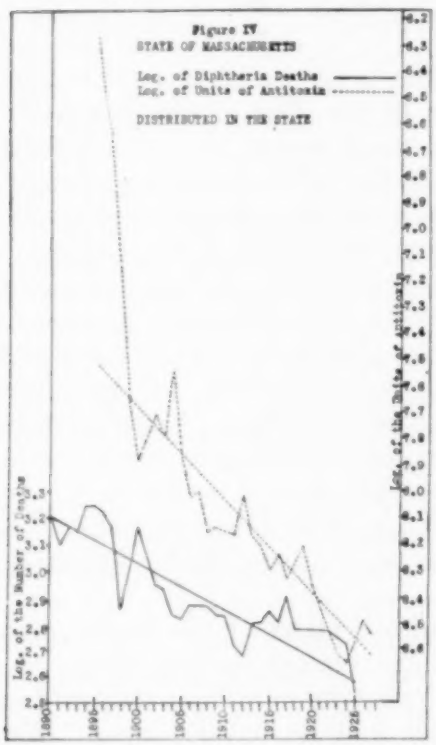


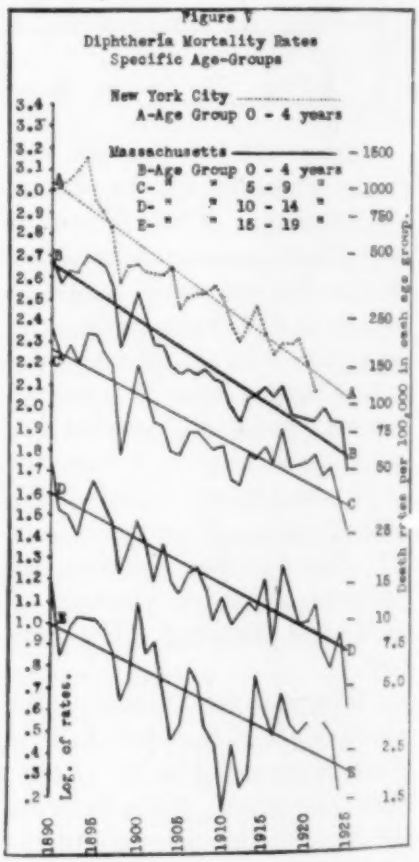
Figure III for England and Wales is of special interest because of the stability of the data, due to the size of the population (35,000,000). There is a fall in the trend representing a fall in death rates from approximately 35 to 10. Is this fall in diphtheria mortality rate the fall one would expect following the universal use of so specific a drug as diphtheria antitoxin? True, the change in trend begins in the region of 1895, but mark also that scarlet fever, for which there was at that time no specific treatment or preventive, has been falling along a trend practically parallel to that of diphtheria. Smallpox also is much less virulent now than it was in the last century. Diseases tend to wax and wane in their prevalence and virulence. Has diphtheria fallen because of our use of antitoxin, or would it have fallen without it? Has diphtheria become less prevalent than it used to be? It is doubtful. Is it less virulent, or is the population less susceptible than in the last century? The answer is necessarily a matter for conjecture.

Why is it that Toronto, Ont., and Cleveland, O., are having diphtheria death rates around 20, while the average for the country as a whole is around 8 or 9? Both are university cities with medical men second to none. Both have antitoxin in unlimited quantities. Why are most of the cities about the Great Lakes having such high death

rates from diphtheria? In other words, how much are we actually controlling diphtheria, on a country-wide basis, by means of treatment?

In Figure IV, the data showing diphtheria deaths in Massachusetts since 1890 are plotted against data showing units of antitoxin produced by the biological laboratories of Massachusetts. The latter data are inverted to show the relation in the trends for both data. It is not safe to draw conclusions from one state only. It is offered here only because it is of interest. Note, however, that in spite of the tremendous increase in the use of antitoxin the trend of the deaths continues unchanged from that prior to the introduction of antitoxin. The value of antitoxin in the treatment of diphtheria has long since passed the experimental stage and needs no verification here. Probably if every case of diphtheria were seen early enough, diagnosed and treated with an adequate dose of antitoxin, there would be few if any deaths. Why then do not mortality rates show more evidence of this effect of antitoxin? The following illustrates one reason. The treatment of diphtheria is necessarily intimately bound up with a large human factor, and human nature is naturally prone to err. Early and





adequate treatments are essentials of successful therapy in diphtheria. The onset of diphtheria is often so insidious that the case is well advanced before the mother is sufficiently alarmed to call a physician. Physicians are only human and have been known to miss the diagnosis. Too often the physician delays treatment while he waits for a laboratory report on the throat smear. The laboratory is operated by human beings and they, though usually right, have also been known to be in error. After the diagnosis, the treatment varies—another human factor.

Since 1926, the writer has studied 297 diphtheria deaths in Indiana. A similar study of 500 diphtheria deaths in New York State was made by Roberts. Together the findings are in part shown in Table I.

TABLE I

STUDIES OF 797 DEATHS FROM DIPHTHERIA

	New York Per Cent	Indiana Per Cent
Physician called after third day of illness	40.0	49.5
Antitoxin administered in repeated doses	33.0	39.7
Antitoxin not given at first visit	40.0	35.0
Antitoxin not given at all	10.6	10.0

On the basis of the above studies of 797 deaths in two states, over 40 per cent of the deaths followed late treatment, and, together with 10 per cent that did not get any antitoxin, make up half the deaths. In over one-third of the deaths, antitoxin was not administered on the physician's first visit. In these cases, after the physician was called, he apparently waited on the laboratory report or missed the diagnosis on his first call. Another delay, and the most unpardonable sin of all, was that in over one-third of the cases antitoxin was given in repeated doses instead of a single adequate dose. Every physician knows that antitoxin does cure diphtheria patients when given early and in adequate dosage. The reason that mortality data do not show more evidence of the value of antitoxin in the reduction of diphtheria mortality rates is found, not in any lack of potency in antitoxin itself, but rather in our administration of it.

The picture, however, is not entirely black and one must not conclude that because crude diphtheria mortality rates do not as a rule show marked reduction following the use of antitoxin, antitoxin has been a failure. This article is written from the viewpoint of the health officer interested in the state- or nation-wide control and elimination of diphtheria, not from the viewpoint of the physician who is interested in the treatment of an individual case. From the latter viewpoint there is probably nothing in medicine that is nearer 100 per cent perfect than antitoxin in the treatment of diphtheria, when given

early and in adequate dosage; but, on the other hand, judging from our experience of 33 years in the use of antitoxin, it is doubtful whether antitoxin has been anything more than one of several factors operating to reduce the general diphtheria mortality. If one were to look at the plotted data with the dates removed from the graphs, it would be impossible to point to a period and be able to say with assurance, "Antitoxin must have been introduced here or there." The change in trend in the last 50 years has been definite and significant, but gradual, all the way.

Now let us observe the data for specific age groups for Massachusetts since 1890 (Figure V). It will be seen that there has been a marked falling off in the mortality rates of the 0–4 age group. The data for the age groups for 1890 and 1925, changed back to numbers, are given in Table II, averages taken from the trend lines. Note the

TABLE II

1890			1925			
Age Groups	Death Rates	Percentage	Age Groups	Death Rates	Percentage	Change
0–4	462.0	64.8	0–4	58.1	57.3	− 7.5
5–9	199.0	27.9	5–9	34.1	33.7	+ 5.8
10–14	39.8	5.6	10–14	6.8	6.7	+ 1.1
15–19	10.0	1.4	15–19	2.0	2.0	+ 0.6

shifting of the mortality percentages from the first age groups to the 5–9 age group. Is this due to the use of antitoxin or to some other factor? Whatever the cause, it has been, no doubt, a potent factor in reducing the death rates since about two-thirds of the deaths occur in the 0–4 age group.

In the last decade much information concerning diphtheria immunization has been compiled and disseminated. Results of the Schick test have been very well studied, so that now we have very good data relative to the natural susceptibility of the various age groups. A large number of children have been immunized, but unfortunately most of this work has been done among the school children and very little among the preschool population. The school children are easily handled in a general immunization campaign, while it is relatively difficult to get the preschool children to the clinic.

TABLE III

RATIO OF PROBABILITY OF DYING OF EACH AGE GROUP ON THE BASIS OF 10–14 AGE GROUP AS 1

Age Groups	0–4	5–9	10–14	15–20
1890	11.6	5	1	0.25
1925	8.5	5	1	0.3

Table III for Massachusetts shows the relative importance of conducting immunization among the various age groups. Take for example the relative value of the immunization of a child 14 years of

age and one under 1 year. In 1 year the 14-year-old child will be in a relatively non-susceptible group, while the infant will be for 15 years in the relatively highly susceptible age groups. Therefore, during the 5 years the infant is in the 0–4 age group he will be the equivalent of over forty-two 14-year-old children. In the next age group, 5–9, he will be the equivalent of twenty-five 14-year-old children. He will be in the 10–14 age group, for 5 years, the equivalent of five 14-year-old children. Thus the immunization of one infant at 6 months of age is the equivalent of immunizing over seventy-two 14-year-old children, other ages in proportion.

Apply the above to an average city of 100,000 people, with an expected death rate of 10 per annum, and the deaths will be divided approximately as shown in Table IV.

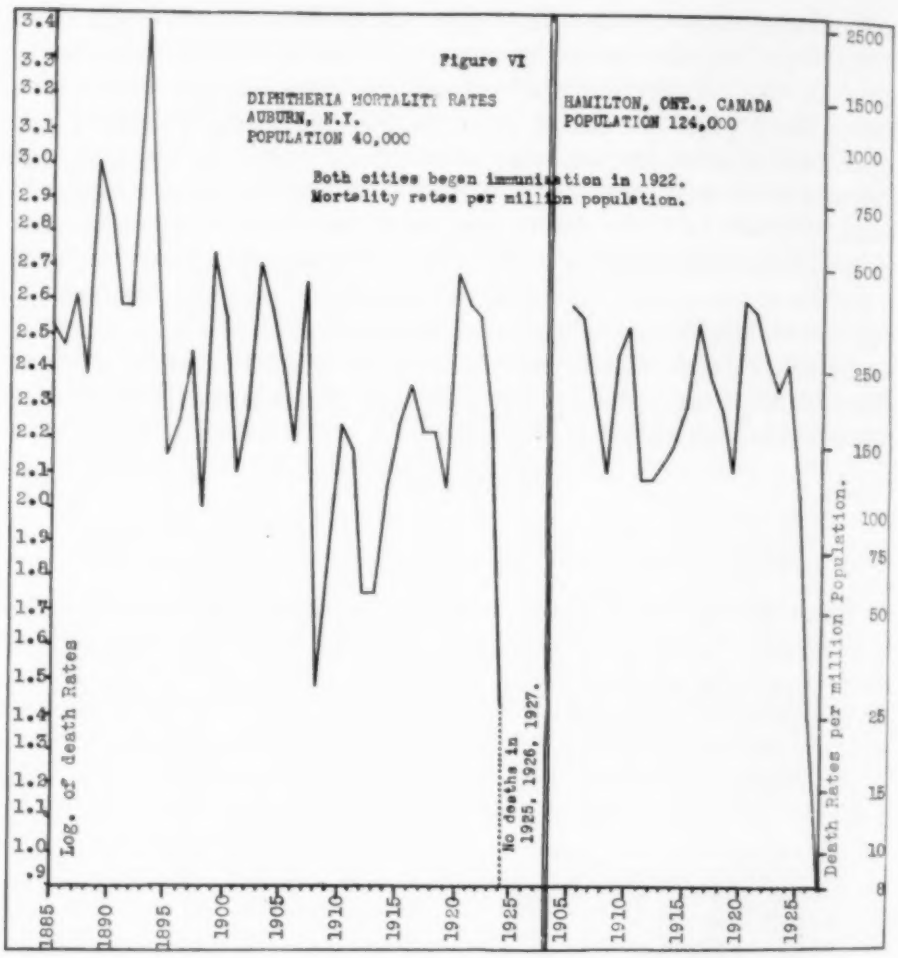
TABLE IV

Age Groups	0–4	5–9	10–14	15–
Populations	10,000	10,000	10,000	70,000
Expected Deaths	6	3 or 4	0 or 1	0 or 1

If we can prevent 1 death in any one age group we will lower the crude death rate by 1. Obviously, if we could protect one-sixth of the first age group, about 1,700, or one-third of the second age group, about 3,300, we could expect to prevent 1 death. If we could immunize 5,000 in each of the first two age groups we would, on the basis of this simple calculation, reduce the deaths by one-half. But, as a matter of fact, the experience of cities, where immunization has been intensively carried out, goes to show that the immunization of half the susceptible children will nearly, if not actually, eliminate diphtheria from the city.

On the other hand, how many children of the 10–14 age group must we immunize to expect a reduction of 1 death? Probably 20,000—and there are only 10,000 in the 10–14 age group—and in the ordinary course of events, without any immunization at all in this age group, there is an even chance that there will be no deaths anyway. In any event, the immunization of all children under 10 years of age will remove the sources of infection, the older age groups will cease to be infected and in this way will take care of themselves.

These simple calculations, though based on the facts of the experience of Massachusetts for 36 years, are purely hypothetical and are offered here merely to show the relative importance of concentrating our efforts in immunization on the most susceptible age groups under 10 years of age. This probably suggests why so much of the immunization work done in the past shows no significant reduction in the crude diphtheria mortality rates.



During the last four or five years many states and cities have experienced a marked fall in diphtheria mortality rates, and likewise many persons have credited it to the immunization work that has been done. This makes propaganda of doubtful value, for in most instances if the data are observed over a long period of time, it will be found that the recent drop is only what we would expect from the operation of chance only. There are exceedingly few communities with data showing significant reduction in diphtheria rates following intensive immunization work.

In this survey the following cities show significant reduction in their death rates following intensive immunization work:

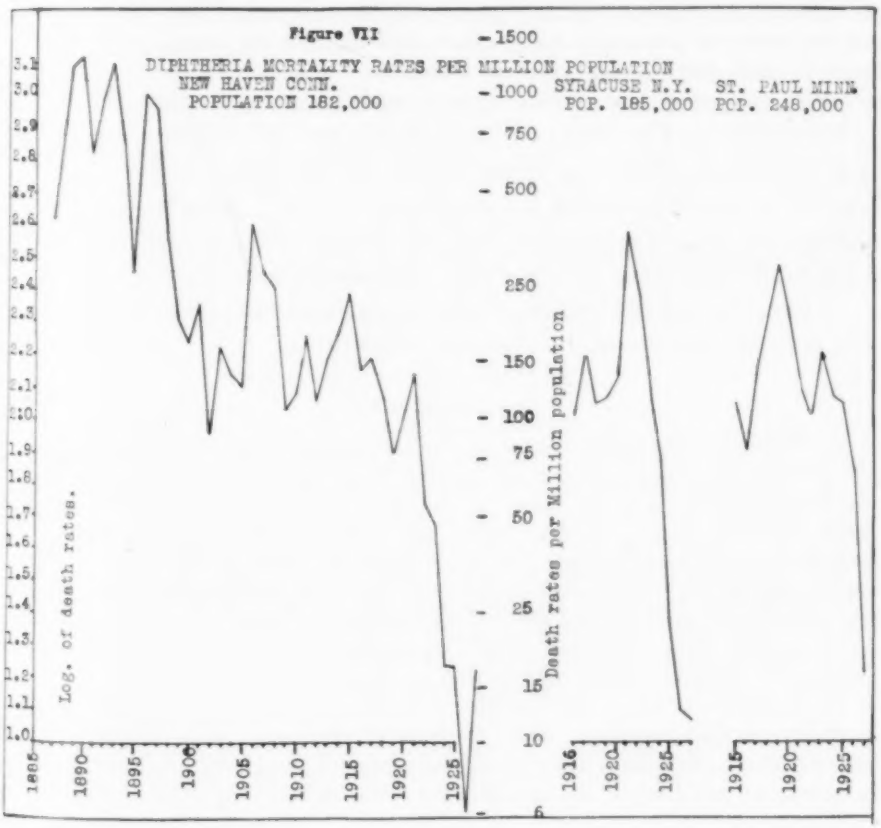
Hamilton, Ont., a city of 124,000 population, began immunization in 1922 since when they have immunized between 20,000 and 25,000 children. Unfortunately more definite data are not available. Children under 15 years of age com-

prise approximately one-third of the population; therefore Hamilton has immunized about one-half of its child population. It is of interest to note that this work has been done with anatoxin and not toxin-antitoxin. Irrespective of the relative value of the two methods of developing active immunization, they work equally well if the work is done thoroughly. In 1927 this city had 11 cases of diphtheria and 1 death. This is a marked and highly significant reduction from the rather high diphtheria mortality rate prior to 1922 as is shown by Figure VI.

New Haven, Conn., is a city of about 185,000 population. They began immunization of their school children in 1923 with the following results: In 1924, there were 11,747 children immunized; in 1925, 9,649; in 1926, 6,888; in 1927, 4,900; making a total of 33,184 children immunized. New Haven has now immunized about one-half of its susceptible population. In 1924 their death rate dropped significantly to 1.7; it was the same in 1925; in 1926 there was but 1 death, or a rate of 0.6; and in 1927 3 deaths, or a rate of 1.6. These figures are quite significant, as can be seen in Figure VII, and future results will be watched with interest.

Syracuse, N. Y., a city of 196,000 population, began immunization in 1923, since when over 23,000 children have been immunized or found immune. Here the child population is about 65,000 under 15 years of age. Their diphtheria death rate has dropped significantly since 1925 (Figure VII).

Auburn, N. Y., with a population of 35,700, has since 1922 immunized or found



naturally immune about 9,000 children. There are probably 12,000 children there under 15 years of age. The death rate dropped in 1924 to 2.7, after which it dropped to zero, where it stayed until January, 1928 (Figure VI). Since then there have been 2 deaths, 1 a child and 1 an adult, both treated with antitoxin late and never immunized. This has rather spoiled the record, through no fault of the public health authorities.

St. Paul, Minn., with a population of 298,000, has immunized nearly 26,000 children since 1924, and although the data, as shown in Figure VII, are over a rather too brief period from which to draw definite conclusions, they look significant. The future alone will show whether this drop is a streak of luck or the result of their immunization. The reports of cases from St. Paul during the past winter seem to indicate a continuance of the downward trend of diphtheria in this city.

Manchester, N. H., has been doing a considerable amount of immunization and will probably get a significant reduction in the next year or so.

Brantford, Ont., a city of about 30,000, with death rates from diphtheria of 7 in the 2 years, 1920 and 1921, dropped to 2 in 1922, zero in 1923, back to 2 in 1924, and has been zero since until 1928. They have immunized to date about 7,600 children. Their data are for too short a period, and their population so small that one hesitates to draw too definite conclusions as to the significance of their results, although what data are available look probably as significant as those of Auburn, N. Y. In 1928, the Health Officer reports 1 diphtheria death, after which 3,204 children were immunized. Our sympathies are all with the child who paid the supreme sacrifice for the negligence of someone, but perhaps, since the death was the means of protecting 3,204 other children from the possibility of a similar fate, the child may not have died in vain.

The dictum of the bloody days of old still holds in the 20th century —"Without the shedding of blood there can be no remission of sin." Surely enough blood has been spilled on the altar of ignorance and neglect to stir this nation into sufficient activity that it will take advantage of the discoveries of medical science which are at hand for the taking, and make the children safe from diphtheria.

Intensive immunization of the population under 10 years of age will control and probably eliminate diphtheria.

SUMMARY

1. Although diphtheria antitoxin, when given early and in adequate dosage, is one of the most efficient of all our specific drugs, yet from our experience of 33 years in this country, it has been but one of the factors in the reduction of diphtheria mortality rates. In most cities and states in which data show diphtheria mortality rates prior to 1895, it is found that the trend of the fall of mortality began from 5 to 20 years prior to the introduction of antitoxin and has continued ever since unchanged save by the fluctuations due to chance.

2. Scarlet fever mortality, for which we had no specific therapy, has fallen along a trend practically parallel to that of diphtheria.

3. A study of nearly 800 diphtheria deaths in the states of Indiana and New York reveals that even now, after 33 years of experience with antitoxin, over 40 per cent of our diphtheria deaths occur in cases sick over 3 days before a physician is called; 10 per cent of the deaths occur without receiving any antitoxin at all;

35 per cent are given antitoxin in repeated doses, although this practice has been condemned for years; and in about 35 per cent of deaths antitoxin was not given on the physician's first visit. Any failure on the part of antitoxin to reduce the general diphtheria mortality rates is not due to failure on the part of the drug but rather to our administration of it.

4. Since 1920 there has been a general and marked fall in diphtheria death rates, which is often attributed to the use of toxin-antitoxin. If these data for these states or cities are observed over a long period of time it will be found that in most instances the present fall of mortality rates is well within the range of chance deviation from the general trend line, and is entirely insignificant, due, no doubt, in most cases at least, solely to the operation of chance.

5. Although diphtheria antitoxin has apparently played but a minor rôle in the general reduction in diphtheria mortality rates since 1890, this disease is being controlled and may even be eliminated by the intensive use of diphtheria immunization in the child population. To date the writer knows of only 6 cities where this has been done sufficiently intensively to significantly reduce the diphtheria mortality. There are other cities, no doubt, with similar results which have not come to the writer's notice.

6. In cities where immunization work has been done sufficiently to reduce the mortality rates significantly, it has been accomplished after about one-half of the child population under 15 years of age has been immunized. Unfortunately, detailed information as to the number of children in specific age groups is often lacking. Such data during the next few years would be invaluable.

7. Since about 60 per cent of the deaths from diphtheria occur under 5 years of age, and about 35 per cent between 5 and 10 years of age, or 95 per cent of deaths occur in children under 10 years of age, it is obvious that in an immunization campaign the work should be concentrated upon the children under 10 years of age, and especially upon the preschool children. This last group is the hardest to reach; yet it holds the key position in all immunization work and our efforts will necessarily be relatively unsuccessful as we neglect this group.

NOTE: The writer wishes to thank all the health officers who have so generously furnished the data which have made this study possible.

Childbirth and Fear

IN a certain sense it may truly be said that fear rules the world. At any rate, it enters into most persons' lives in a most disconcerting fashion. And confidence casts out fear—especially confidence based on knowledge, according to Eardley Holland in discussing the midwives of Sweden. In that country midwives are required to have a good education before beginning the study of midwifery, a training which lasts two years. The medical student, in that country, also gets an excellent training in midwifery. The result of it all, according to Holland, is an "atmosphere of confidence" on the part of the public which "has a profound influence in producing easy labor." All normal confinements there are handled by midwives, but in the abnormal cases there is an adequate supply of well-trained obstetricians upon whom to call.

Dr. Holland thinks that England and America might well profit by Sweden's example.—Editorial—*Maternity and Child Welfare*, Aug., 1928.

Heart Disease and School Life

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LIMITATION of an individual's capacity for physical activity is the penalty imposed by heart disease. To understand the cause of this restricted physical ability, it is essential that one have a fundamental knowledge of the physiology of the heart and an appreciation of the changes in its function which result from damage to its structure. Without this intelligent background competent supervision is impossible and the cardiac child is liable to unconscious neglect or overanxious solicitude.

Normal healthy life is impossible without an adequate circulation of the blood. The flow of blood must be continuous and at the same time distributed in amounts which will vary in accordance with the physiological needs of the different parts of the body. Muscle at rest requires a certain amount of blood, while muscle in action calls for an increased supply which is proportionate to the energy expended.

It is quite obvious that the heart which is the pumping force behind the circulation will have the least amount of work to do when the body is in the condition of complete physical rest. Muscular activity demanding a greater output of blood increases the work of the heart, the maximum expenditure of energy for any individual depending on the ability of his heart to propel the requisite amount of blood. This is true for both normal and diseased hearts.

It is not expected that a man accustomed to heavy work and one of sedentary habits will have the same capacity for physical exertion; but it is expected that every healthy heart will have the power to meet the demands of the ordinary physical activities of daily life. This ability to perform the ordinary activities of life is a standard by which we can estimate the functional capacity of the heart.

In using such a standard one must exclude some extraneous conditions such as acute and chronic infections, anemia, obesity, convalescence and injury or deformity, which may adversely affect the strength of the heart muscle and all the muscles of the body. But other things being equal, individuals of similar physique and habits are expected to show the same reaction to physical exertion.

Inability of the heart to propel enough blood to permit the ordinary

activities without undue discomfort constitutes heart failure. Heart failure does not occur in healthy people. It is a result of heart disease.

Disease may attack the heart in any of its structural elements and destroy the integrity of the mechanism on which the circulation of the blood depends. A damaged heart however may so adjust itself that normal physical activity is possible, or it may be so handicapped that an individual is incapable of performing the ordinary tasks of daily life without discomfort. This handicap will vary in degree. It may be so mild that only slight limitation of activity is imposed, or so severe that no exertion is possible and absolute rest in bed is imperative.

Organic heart disease may be divided into two stages, active and inactive. During the active stage imflammation is actually present in the tissues of the heart. When all evidence of the activity of the infection has disappeared healing takes place by the formation of scar tissue. This is the inactive stage. The progress of the disease has been halted but structural damage remains.

In children the activity of the infection within the heart, more than the mechanical damage to its structure, is the determining factor in heart failure. When the infection becomes inactive children with badly damaged hearts often become capable of carrying on the activities of daily life with little or no discomfort.

The incidence of heart disease among the school children of this country can only be roughly estimated at the present time. Figures are obtainable from only a few localities, and in interpreting these it is necessary to be quite certain that the methods of examination were uniform and the criteria for diagnosis fixed and well observed before it is possible to regard the data with confidence.

Of the 120,000 school children examined in Boston 2,311 were suspected of having heart disease and were referred for special cardiac examination. Of these 625 were found to have organic heart disease. In addition to these there were 160 children of school age but not attending school who had organic heart disease.

The figures for New York were obtained in the routine examination by the physicians of the Department of Health, Bureau of Child Hygiene. On reëxamination of some of these children under more favorable conditions and with clothing removed from the chest the figure was reduced to 7 per 1,000. It is rather significant that in 1924, in a routine examination of a large sample (598,167) of children from the elementary schools of the whole of England and Wales, 7 per 1,000 (4,285) were found to have organic heart disease.[1]

Until such time as the adequate physical examination of children is a routine practice, many cases of heart disease will escape detection

TABLE I

INCIDENCE OF ORGANIC HEART DISEASE IN SCHOOL CHILDREN OF LARGE CITIES

City	Year	Number Examined	Rate per 1,000
Philadelphia [1]	1924	23,671	6.3
Boston [2]	1926	119,337	6.6
Chicago [3]	1923	158,826	9.0
Chicago [4]	1924	153,671	15.0
Chicago [5]	1925	130,266	17.0
New York [6]	1918	250,000	16.0
New York [7]	1918–1922	1,336,343	13.9

1. Board of Education, Department of Public Health, City of Philadelphia, Division of Medical Inspection of Public Schools, 1924.
2. *Nation's Health*, Dec., 1927.
3. *Bull. Chicago Heart Assn.*, Vol. 5, Nos. 1, 2, 3, 4.
4. *Bull. Chicago Heart Assn.*, Vol. 5, Nos. 1, 2, 3, 4.
5. *Bull. Chicago Heart Assn.*, Vol. 5, Nos. 1, 2, 3, 4.
6. Baker, S. J. School Medical Inspection in New York City. *Monthly Bull.*, Department of Health, 1921. XI:97.
7. *Report of the Committee on Schools of The Association for the Prevention and Relief of Heart Disease*, June 14, 1923.

and purely functional disturbances will be wrongly diagnosed as organic heart disease. A satisfactory knowledge of a child's physical defects could be obtained by an examination at the time of admission to school, by reëxamination when returning to school after a period of illness, and by a thorough reëxamination at regularly fixed periods.

In most localities the medical school officer is not legally permitted to remove the clothing from the chest to make an examination. Under such circumstances a proper diagnosis can be obtained only by referring suspected cases to their private physician or, when they are unable to pay, to a cardiac clinic.

The detection of organic heart disease in a child is only the first step in the problem of its care. Classification of these children according to the degree of limitation of their physical capacity is necessary for intelligent supervision.

For the purpose of defining the different degrees of functional capacity of the heart, the American Heart Association has adopted a non-technical classification which defines the physical ability of the patient as modified by the condition of his heart.

The systematic registration of cardiac pupils in accordance with this classification will permit some definite standardization, will curtail unnecessary absences, will guide in physical exercises and in the supervision of the ordinary exertions incident to the daily school life.

THE CLASSIFICATION

Class I—Patients with organic heart disease able to carry on ordinary physical activity without discomfort

Class II—Patients with organic heart disease unable to carry on ordinary physical activity without discomfort

A—Activity slightly limited
B—Activity greatly limited

Class III—Patients with organic heart disease and with symptoms or signs of heart failure at rest, unable to carry on any physical activity without discomfort

Class E—Possible heart disease. Patients who show abnormal signs and symptoms referable to the heart but in whom the diagnosis of heart disease is uncertain

Class F—Potential heart disease. Patients without heart disease, whom it is advisable to follow because of the presence of a history of an etiological factor which might cause heart disease (in such cases the etiological factor should be stated)

Class I—These children have no symptoms and their physical capabilities are the same as healthy children. Unless reinfection occurs the heart condition is stationary. Accordingly they need but little supervision. They can indulge in the same exercises and pastimes as other children; but by way of precaution it is wise to place some limit on their physical activities. They should not be permitted to engage in competitive athletics or to indulge in games which demand sudden severe physical strain.

Class II A—These children are capable of performing the ordinary activities of childhood, but extraordinary exertions such as fast running, vigorous play, hurrying upstairs produce undue breathlessness and fatigue which are apparent to any attentive observer. Games and exercises which produce only temporary shortness of breath in healthy children are too strenuous for the cardiac children of this class. Running, skipping the rope, prolonged tiring drills should not be permitted. They may enter classes of physical culture but should be compelled to rest during any part of an exercise which unduly tires them.

Class II B—The physical ability of children in this class is noticeably limited. The vast majority have active heart infection as indicated by some degree of fever and a typical white blood cell count. They are sick children and though some of them may be physically able to attend school they should be at rest in bed. It is especially important that children in this class be recognized, because attendance at school is further detrimental to their health. Parents should be informed that these children are unfit for school, that they should be at home and under the care of a physician till all signs of activity of the heart infection have disappeared. After convalescence these children can return to school, being reclassified in Class II A or Class I.

Some children with congenital heart disease have a decided limitation of their physical ability, and occasionally a child with acquired heart disease may have had the heart so severely damaged that his limitation of physical activity is quite marked even in the absence of active infection. Education is merely a passing event with such chil-

dren. All of them will be unfit for any future occupation and their expectancy of life does not reach adult years. These children should not be permitted to climb stairs. If regularly present at school they may be placed in a class with other children who are physically handicapped.

Class III—It is unnecessary to consider the children in this class more than to state that they should not go to school. They are compelled to remain in bed because of the degree of failure of their hearts. Exceptionally, when proper supervision is not maintained, a child in this class may manage to attend school at irregular periods. This is dangerous to the life of the child and should not be permitted.

RECLASSIFICATION

Some children do not remain permanently in the same class. Children in Class I may revert to Class II A, II B or III, or conversely children in the poorer classes may improve and require reclassification on a higher basis. The presence or absence of infection in the heart is usually the cause of change in symptoms which determine the altered classification. The child's school activities should change in accorddance with a reclassification.

E—Possible Heart Disease—It is impossible to outline any definite regulations for the physical activities of these children. Limitation may or may not be advisable. The necessary restriction should be determined by the physician of each individual child.

F—Potential Heart Disease—As a cause of heart disease in childhood, rheumatic infection stands preëminent. It has been estimated that as high as 97 per cent of heart disease in childhood is due to rheumatism. It is also claimed that 75 per cent of children who have rheumatism develop organic heart disease. Chorea, or St. Vitus' dance, and growing pains are but different manifestations of rheumatic infection. Some cases of tonsillitis are suspected of being due to the same infection. Scarlet fever is frequently followed by rheumatic symptoms. The actual presence of heart disease which has been caused by these conditions may not be manifested till several months or years later, but during all this period it is essential that the child be under the observation of a physician and that its activities be regulated according to his orders.

REGISTRATION

In a school of 1,500 pupils there would be found probably 10, at the outside 20, children with organic heart disease. From figures available, it can be estimated that 55 per cent of these children are in Class I, 33 per cent in Class II A, 7 per cent in Class II B and 1 per cent in Class III. Translated into numbers: for a school of 1,500 pupils

with a maximum figure of 20 cardiac children one would expect to find 11 children in Class I, about 7 in Class II A, and occasionally a child in Class II B and Class III. This means that the number of children with organic heart disease attending a school of this size would not exceed 18, and probably would be as low as 9 or 10. If to these we add the children who are classified as potential cardiacs, the number will be increased somewhat, but it is still very small when compared with the total school attendance. To supervise properly even this small number of children it is necessary to keep a register. Individual cards for each child, specifying its classification, physical and nutritional defects, can be kept on file, the family or clinic physician being responsible for the data.

GENERAL MEASURES

Aside from heart disease, these children present the same problems in general health as do other children. But in their case it is probably more important that a special effort be made to build up the natural resistance to infection, with the hope of preventing further damage to the heart already diseased.

Measures calculated to attain this end are:

1. Improvement in general nutrition by good food, sufficient sleep, fresh air both day and night, summer vacations in the country
2. Best possible home conditions, eliminating as far as possible the privations of poverty and unhygienic living and sleeping quarters
3. Proper clothing for the different seasons of the year
4. Avoidance of physical strain (unwise parents and guardians may compel cardiac children to perform tasks and household work beyond their capabilities)
5. Institution of those methods which have been found valuable in protection against infectious diseases
6. Correction of physical defects: Eradication of possible foci of infection, especially diseased tonsils and decayed teeth
7. In some districts the provision of transportation to and from school
8. The same protective supervision exercised in school, carried into the hours beyond the school day and into the vacation periods

Such a régime can be instituted and carried out only by the cooperation of the school authorities, the parents, the physician, the nurse, the social worker, welfare agencies and departments of health.

The school nurse or social worker should see that all children with heart disease and those with possible or potential heart disease are under the observation of their own physicians or a cardiac clinic. A visit at least once in three months is desirable, but in some cases it may be necessary to see a physician at shorter intervals.

The actual instruction of a cardiac child should present no more difficulties than are found in the case of the average healthy child. A child with heart disease who is fit to attend school is just as keen

mentally and just as receptive as other children. Attendance at classes is the principal incidental problem. However, "it is not detrimental for children with heart disease to make a perfect score in attendance; for a large number of them do so." Many absences are entirely unnecessary because of a "too ready acquiescence in the child's desire to remain away from school." A careful follow-up in New York showed that "63 per cent of absences were for reasons entirely unconnected with disease of the heart." Holidays, truancy, weather, and family social events accounted for 37 per cent, minor ills for 26 per cent.

It is incumbent on the school authorities to encourage these children to continue their education beyond the elementary grades. Parents should be enlightened on this phase of the problem and informed that "adequate education is more essential for the cardiac child than for the average healthy child, since this opens to him opportunities of employment and amusement which are more likely to conform to his capacity for physical exertion. Most of the work of the uneducated and unskilled is of the laborious nature," and therefore unsuitable for people with heart disease.

In children, physical exertion is not a significant factor in the production of heart failure, while in the adult with heart disease it is probably the most frequent cause of a cardiac breakdown. But inasmuch as these children are being prepared for adult life, their education must be directed along lines which will enable them to engage in occupations which will not require undue physical exertion.

Children who are in a position to continue their education through high school and even through college will be fitted for employment in which the danger of overstrain can be practically eliminated. Those children who for various reasons are unable to pursue the higher courses may enter a trade school and be taught manual work which will prepare them for positions in which technical skill and not physical strength is requisite.

Children with heart disease should know that they are handicapped, but at the same time they should have a true appreciation of this handicap. The school training should make them realize that within their limitations they can lead useful and happy lives.

Exercise and physical exertion which do not overtax the heart improve the physical fitness of people with heart disease.

Morbid fear of heart disease and distorted sense of its dangers lead to a life of unhappy indolence.

REFERENCE

1. *Report of the British Ministry of Health on Acute Rheumatism in Children*, 1928.

The Minimal "Chlorine Death Points" of Bacteria

I. Vegetative Forms

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and
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ALTHOUGH chlorine gas is universally used in the treatment of water supplies, and its derivatives are finding an ever increasing field of usefulness in the disinfection of milk and beverage bottles, dishes, and utensils of various kinds, little is known of the actual or relative amounts of chlorine required to kill specific species of organisms under given conditions. The amount of available chlorine used in practical chlorination has been arrived at empirically or indirectly, and in many instances is probably far in excess of the amount actually needed to destroy the pathogen under consideration. The amount of chlorine required to obtain satisfactory results varies with many factors, and especially with the kind of fluid or material to be sterilized.

Little, if any, work has been done to determine the least amount of chlorine required to kill known numbers of known species of bacteria under fixed conditions that admit of comparison of their relative resistance.

It has not been determined definitely what organism may be considered a safe index of effective chlorine treatment or whether a given organism can be used as an index under different conditions. *B. coli* has been almost universally accepted as the index of safety in the treatment of water supplies. Its acceptance, however, has been based largely on theoretical considerations and on the analogy of its greater resistance to heat and longer survival than the common pathogens which may be present in water.

For these reasons it was considered desirable to study the effect of chlorine on specific bacteria under controlled conditions to determine, if possible, the minimal dosage of free chlorine required to kill specific species of bacteria, to ascertain their relative resistance to free chlorine and, on the basis of these factors, to select, if possible, an organism that could be used as a safe index of effective chlorine disinfection.

In this article the methods used and results obtained with vegetative forms of bacteria are presented.

The methods of preparing the materials for the determinations were as follows:

The chlorine solution used was prepared by adding gaseous chlorine to distilled water until a final concentration of 60 p.p.m. of residual free chlorine was obtained. This served as a stock solution and was stored in a brown bottle in an icebox. At frequent intervals the free chlorine content of the solution was determined, and approximately every two weeks during the experiment a new stock solution was prepared.

The organisms tested included the common intestinal forms, and other pathogenic and non-pathogenic organisms, numbering in all 235 strains.

The intestinal organisms and *B. proteus*, *B. prodigiosus* and *B. pyocyaneus* were grown on agar slants. *Cl. welchii* was grown in glucose broth under anaerobic conditions. The streptococci and pneumococci were grown either in glucose broth or in a special streptococcus broth. The staphylococci were grown in glucose broth and the diphtheria organisms were grown in glucose broth, ascites fluid or serum glucose broth.

The cultures were centrifuged, washed, and resuspended three times in sterile distilled water. They were then diluted in sterile distilled water until a suitable number of organisms per c.c. were present.

The exposures to chlorine were made in sterile distilled water as a menstruum. One hundred and fifty c.c. of distilled water were placed in Pyrex Erlenmeyer flasks, and the contents and flasks were sterilized in an Arnold sterilizer. After the flasks had cooled to room temperature, 50 c.c. of the water in each flask were removed and the chlorine absorbing properties determined. Those flasks containing water showing any appreciable absorption were discarded. The remaining flasks were used for the experiments. The pH value of the water used ranged from 6.4 to 7.2. It is probable that the elimination of the water showing chlorine absorption also eliminated water of low or high pH value.

The tests were carried out by adding approximately 100 to 300 organisms per c.c. to the contents of each of two flasks. From one flask 1 c.c. was planted to determine the number of organisms present. Then a definite amount of free chlorine was added to each of the flasks. One flask was immediately subjected to chemical analysis to determine the amount of residual chlorine present. The other flask was

used for determining the rate of destruction of the organisms and the time required to kill. To do this 1 c.c. of the contents was plated at intervals of 8–10 seconds, 15 seconds, 30 seconds, 45 seconds and 60 seconds. The nutrient agar plates were poured immediately after transferring each 1 c.c. portion from the flasks. These plates were incubated for 48 hours at 37° C. At the end of this time the plates were counted and the rate of destruction and time required to kill the organisms present recorded. It was found that 48-hour incubation was necessary, because in many instances numerous colonies appeared in 48 hours on plates which in 24 hours had no visible colonies. For the organisms that would not grow in plain agar, slight variations of the above procedure were used. With such organisms it was not possible to establish the rate of destruction by chlorine, as no satisfactory means of counting them was available, either before or after the addition of the germicide. It was only possible to determine the length of time required to kill all of the organisms. For this purpose the contents of the flasks were streaked or planted in the type of medium in which the organisms were originally grown. The experiments were carried out at temperatures ranging from room temperature to within a few degrees of the freezing point of water.

RESULTS

The results are shown in Table I. It will be noted that all strains of *B. typhosus*, *B. paratyphosus A*, *B. paratyphosus B*, *B. enteriditis*, *B. dysenteriae*, *B. suipestifer*, *B. proteus*, *B. prodigiosus*, and *B. pyocyaneus* were killed in 15 seconds by a dosage of 0.1 p.p.m. of free chlorine.

Many of the strains of streptococci of both hemolytic and fecal types were also killed by this amount of chlorine, as were all the strains of *Cl. welchii* (vegetative cells) and most of the strains of *C. diphtheriae*. In some instances slightly longer periods of time, i.e., 30 to 45 seconds, were required to kill all the organisms at the concentration of 0.1 p.p.m.

A few strains of pneumococci were slightly more resistant to chlorine than most of the other organisms. Four out of nine strains were killed by 0.1 p.p.m. of chlorine in 15 seconds. The remaining strains were killed by 0.2 p.p.m. of chlorine in less than 1 minute. The strains of *C. diphtheriae* not killed by 0.1 p.p.m. of chlorine were killed by 0.15 p.p.m. in 15 to 30 seconds.

Most of the strains of streptococci not killed by 0.1 p.p.m. of chlorine were killed by 0.15 or 0.20 p.p.m., although three strains were not killed until exposed to 0.25 p.p.m. of chlorine for 15 seconds to 30

TABLE I

DOSAGE OF FREE CHLORINE REQUIRED TO KILL VEGETATIVE CELLS OF BACTERIA IN 15–30 SECONDS

Chlorine p.p.m.	Species	No. of Strains	Species	No. of Strains
0.10	*B. typhosum*	21	*B. pyocyaneus*	6
	B. paratyphosum A	6	*C. diphtheriae*	27
	B. paratyphosum B	6	*Achromo bacterium viscosum*	3
	B. dysenteriae	8	*Strep. scarlatinae*	14
	B. enteriditis	4	*Strep. fecalis*	11
	B. proteus	2	*B. suipestifer*	8
	Cl. welchii	8	*B. prodigiosus*	6
	Bruc. melitensis	1	*Bruc. abortus*	1
	Staph. albus	4	*Staph. aureus*	4
	Pneumococcus	4	*Strep. hemolyticus*	11
0.15	*C. diphtheriae*	12	*Strep. morbilli*	2
	Strep. scarlatinae	6	*Staph. albus*	4
	Strep. fecalis	2	*Pneumococcus*	5
	Staph. aureus	4	*B. coli* (fecal)	9
	Strep. hemolyticus	10		
0.20	*Pneumococcus*	4	*B. coli*	10
0.25	*Strep. hemolyticus*	3	*B. coli* (fecal)	9
			Total Strains	235

seconds. These latter strains were of the hemolytic variety. Two were isolated from milk and one came from the Boston epidemic of streptococcus sore throat of 1911. It seems probable that the apparently higher resistance of these cocci to chlorine was due to the larger inoculum found necessary to obtain consistent growths. Considerably heavier inoculations of the streptococci were required than in the case of other organisms.

B. coli proved on the whole to be more resistant to free chlorine than the other organisms studied. None of the strains showed any appreciable reduction in number when exposed to 0.1 p.p.m. of chlorine. Nine strains were killed by 0.15 p.p.m. of chlorine, ten strains required 0.2 p.p.m., and nine required exposure for 15 seconds to 0.25 p.p.m. of chlorine for their complete destruction.

SUMMARY AND CONCLUSIONS

From these results it will be seen that a large majority of the vegetative types of organisms considered to be of sanitary importance in connection with water supplies, milk supplies, dish washing, bottle washing, and general disinfection, whether of intestinal or respiratory origin, are killed in a few seconds by rather small doses of free chlorine, when exposed in a suspension containing no organic matter or other substances that react with or absorb the chlorine. This was

found to be true for temperature ranges varying from room temperature to within a few degrees of the freezing point of water.

The amount of chlorine required to kill most of the intestinal pathogens studied under these conditions was 0.1 p.p.m., with the greatest destruction of the organisms occurring within the first 15 seconds of exposure. The same amount of chlorine destroyed most of the pathogenic types of respiratory organisms tested.

In each group, however, there were individual strains which were more resistant to chlorine than the others, requiring more than 0.1 p.p.m. to accomplish their destruction. In the intestinal group of organisms, the most resistant type encountered was *B. coli*. In the group of respiratory origin, three strains of hemolytic streptococci, out of 24 strains tested, required larger quantities of free chlorine for their complete destruction. All the resistant strains of streptococci were killed by 0.25 p.p.m. in 15 to 30 seconds. It is probable that the apparently higher resistance of the streptococcic strains is due to the larger number of organisms used in order to secure consistent growths.

From the standpoint of resistance to chlorine, *B. coli* stands out among the organisms tested as the most suitable for use as an index of the effectiveness of chlorine disinfection. The requisites of such an index organism are: (1) that it be as resistant as, or somewhat more resistant to, free chlorine than the pathogenic organisms which are to be destroyed; (2) that it grow readily on simple media; (3) that it be readily recognizable by simple routine tests. From the standpoint of availability, rapidity of growth, and ready detection, *B. coli* offers superior advantages as an index organism, and it is our feeling that its consistent absence in a menstruum after chlorine disinfection is valuable evidence of the destruction of the pathogens here studied.

On the whole, the experiments appear to furnish a satisfactory theoretical basis for the current practice of relying on the consistent destruction of *B. coli* in water as a criterion of effective chlorination, and that they may also justify a more general application of the same criterion to other type phases of chlorine disinfection now being developed, such as the washing of milk bottles and equipment and the washing of dishes and eating utensils.

A Sickness Survey of Winchester, Mass.*

Part II: Communicable Disease

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A DESCRIPTION of the manner in which the survey was conducted, together with a short review of the demography of Winchester, was included in Part I.[1] Individuals under 20 years of age were questioned as to whether they had ever had any of the following diseases: measles, whooping cough, chicken pox, mumps, scarlet fever, German measles and diphtheria. They were also questioned as to the age and year when they had the disease, whether a doctor was employed, and whether they had had a second attack of the same disease.

Through the courtesy of S. J. Crumbine, M.D., of the American Child Health Association, unpublished data in connection with a similar survey in Gardner, Mass., covering the diseases scarlet fever, diphtheria and measles, are included in this report. Available data from other similar studies[2, 3, 4, 5] are included for comparison with those of Winchester and Gardner.

The number of persons (under 20 years of age) surveyed in Winchester was 3,365; in Gardner, 3,305; in Collins's report, 31,353; in London, 8,786; in Shelburne-Buckland, 394; in Brazil about 500, and in Baltimore about 5,000.

From the collected data, the percentage of individuals at different ages who suffered an attack of the specified diseases at some time during their lifetime was computed and compared with similar percentages from the other studies cited.

In Winchester approximately 80 per cent of the population under 20 years of age was surveyed; in Gardner the percentage was about 45. We feel that in both Winchester and Gardner a random sample of the age distribution of the population under 20 was approximated.

If the percentages from the different studies are plotted and smoothed, the shapes of the resulting curves vary. The curves for the

* The first of the series of studies, *Part I: General Morbidity*, by Herbert L. Lombard, M.D., M.P.H., was published in the September, 1928, issue of the AMERICAN JOURNAL OF PUBLIC HEALTH AND THE NATION'S HEALTH. Parts II and III are somewhat shortened. Reprints including full detailed material may be obtained from the authors.

seven diseases fall roughly into two groups. The one group including chicken pox, measles and whooping cough shows a sharp rise in the percentage of those attacked from 0 to about 10 years of age. The other group including diphtheria, scarlet fever and German measles shows a gradual increase in the percentages from 0 to about 20 years of age. The curve of mumps falls between the curves of the two groups mentioned, but more nearly approaches the curve of the first group.

These facts coincide with what is generally known in regard to the higher rate of infectivity in diseases like chicken pox and measles, as compared with a lower rate of infectivity for diphtheria and scarlet fever, based on clinical evidence.

The curve of any of these diseases would be affected by a falling incidence of the specific disease, whatever its cause. This applies in particular to diphtheria in Gardner, where there was a definite outbreak in 1917 with a decline since, and no cases reported in the last 2 years.

Chicken Pox—Slightly more than 50 per cent of the people have had chicken pox by the time they reach their 20th birthday. This disease is somewhat like measles. It attacks the population quickly and reaches its saturation point at about age 10.

Measles—By the time individuals reach the age of 20, roughly 90 per cent have had measles. There is some evidence that above the age of 10 both the individual questioned and his parents have forgotten whether the child concerned has had the disease. This is true in Gardner where the percentages decrease slightly but constantly from age 10 to 20. Although in Gardner the figures show that about 90 per cent of the population surveyed had the disease by their 10th birthday, for the total populations included in the study this is true of approximately 80 per cent.

Whooping Cough—By the time individuals reach age 20, from 60 to 75 per cent have had this disease. The percentage for Baltimore (43) is low for some reason.

Mumps—The incidence of this disease, except in Baltimore where the percentage is unusually low (24), varies from about 40 to 60 per cent at age 20.

Diphtheria—Making a rough allowance for variation due to small numbers, the percentages at age 20 in the studies cited vary from 3 to about 15. In Massachusetts, unpublished figures show that the morbidity and mortality from this disease vary with the size of the community, while in Shelburne, Winchester and Gardner a somewhat similar variation occurs. Shelburne, the smallest, is distinctly a rural

community. Although the population density of Winchester, the next larger, is somewhat higher than that of Gardner, the largest, Winchester is much more distinctly a residential community than is Gardner.

Scarlet Fever—Individuals who have had this disease by the time they reach the age of 20 vary in their percentages from 2 to 31.

German Measles—The incidence of this disease varies from 12 to about 23 per cent in the populations studied.

From the London, Winchester and Gardner figures at age 10 these percentages for the specified diseases are estimated as follows: chicken pox, 50; measles, 80; whooping cough, 65; mumps, 45; diphtheria, 5; scarlet fever, 10; German measles, 10. Of the two sets of percentages offered, we are inclined to believe that the percentages given at age 10 are more reliable than at age 20.

Secondary Cases—Table I shows the percentage of persons who had two independent attacks of the same disease. We are not satisfied that they are an accurate estimate of recurrent attacks.

TABLE I

PERCENTAGE OF INDIVIDUALS HAVING HAD ONE ATTACK OF SPECIFIED DISEASE WHO HAD A SUBSEQUENT ATTACK

Disease	Winchester Per Cent	Gardner Per Cent
Measles	1.9	1.3
German Measles	2.4	—
Chicken Pox	0.3	—
Whooping Cough	0.4	—
Mumps	0.1	—
Diphtheria	1.1	0.6
Scarlet Fever	0.0	2.5

Number Employing Physicians—Table II shows the percentage of cases in which a physician was employed. The percentages were higher in Winchester than in Hagerstown or Gardner for most of the diseases, and may be due to a better economic status of the population

TABLE II

NUMBER EMPLOYING A DOCTOR

	Hagerstown		Winchester		Gardner	
Disease	Cases	Per Cent of Total Having Disease	Cases	Per Cent of Total Having Disease	Cases	Per Cent of Total Having Disease
Measles	364	64.1	1518	76.8	1253	55.1
Diphtheria	44	97.8	90	91.0	151	96.2
Scarlet Fever	33	97.1	247	91.5	248	87.4
Whooping Cough	183	48.8	1319	74.4	*	*
Chicken Pox	105	45.2	1127	78.2	*	*
Mumps	3	33.3	666	74.8	*	*
German Measles	7	38.9	191	77.6	*	*

* Information not available.

in Winchester. A study of cases where practitioners other than physicians were employed in Winchester showed 4 per cent in scarlet fever, 2 per cent in diphtheria, 1 per cent in whooping cough, about 1 per cent in measles and 1 per cent in chicken pox.

Reporting of Diseases—Table III shows the percentage of reported cases for the three diseases in Gardner, for seven diseases in Shelburne and Winchester and for five in Hagerstown. The Gardner figures as well as the Winchester figures were obtained by taking the ratio or reported cases to the estimated number of cases based upon those found in the survey. It is worth noting that the figures show that with few exceptions scarlet fever and diphtheria are better reported than the other diseases.

Of all the percentages quoted, we are inclined to feel that the Hagerstown estimates are the most reliable.

TABLE III

PER CENT OF CASES REPORTED

	Diphtheria	Measles	Scarlet Fever	Chicken Pox	German Measles	Mumps	Whooping Cough
Gardner *	68.9	19.6	69.8	—	—	—	—
Winchester †	119.6	48.6	93.6	48.4	112.9	53.1	20.7
Shelburne †	180.0	33.3	88.1	3.5	19.4	4.0	.8
Hagerstown ‡	88.7	40.3	102.0	34.4	—	—	30.5

* 1919–1926.
† 1917–1926.
‡ Dec. 1, 1921–Mar. 31, 1924.

SUMMARY

1. The seven diseases fall roughly into two groups. One group includes chicken pox, measles, and whooping cough, which shows a sharp rise in the percentages of those attacked from 0 to about age 10. The other group includes diphtheria, scarlet fever, and German measles, which shows a gradual increase in the percentages attacked from 0 to about age 20. The rise in the percentages of those attacked by mumps is more nearly like that in the first group.

2. At age 20, from the London, Winchester and Gardner figures, the percentage of individuals who had had the following diseases was roughly: chicken pox, 55; measles, 90; whooping cough, 70; mumps, 50; diphtheria, 15; scarlet fever, 20; German measles, 15.

3. At age 10 these percentages for the specified diseases were estimated as follows: chicken pox, 50; measles, 80; whooping cough, 65; mumps, 45; diphtheria, 5; scarlet fever, 10; German measles, 10.

4. Doctors attended in Hagerstown, Winchester, and Gardner from 87 to 98 per cent of the cases of diphtheria and scarlet fever and from 55 to 77 per cent of the cases of measles. In Winchester they

attended about 75 per cent of all the others of the seven diseases, and in Hagerstown from 33 to 49 per cent.

5. Scarlet fever and diphtheria are generally better reported than the other diseases.

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Part III: Physical Defects of School Children

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WINCHESTER, through an interested school committee and an unusually well-informed superintendent, was one of the first towns in the state to initiate a broad school health program. The school physician, whose standards are excellent, gives a "stripped to the waist" examination to every child from kindergarten through high school; he devotes an average of 2 hours a day to school work. A woman physician examines the junior high and high school girls. A nurse is employed full time in the schools. Health education is carried on by the teaching staff. Of the 8 school buildings, 5 have been built within the last few years.

Physical examinations of all the children were made in the fall by the school physician. In June before school closed the physician making the survey checked every child to note the defects which had been corrected during the winter. All the necessary records in this connection were collected, coded and studied. Fifteen hundred and thirty-five children were studied. Those whose defects were corrected were not counted as defective in the tables on absence.

A record of absences with duration and cause, for all children from kindergarten through junior high school, was kept through the school year 1926–1927 by the teachers.

DISCUSSION OF RESULTS

Defects and Sex—No association was found between sex and defects or between sex and the frequency of defects. Two hundred and eighty-one, or 36 per cent of 772 boys examined, had no defects noted;

283, or 37 per cent of 763 girls examined, had no defects noted; 38 per cent of both boys and girls had more than one defect.

Defects and Economic Standing—The children from the less privileged group, namely, the Noonan and Lincoln schools, showed a greater percentage of every defect than those from the more privileged, or the Mystic and Wyman schools. Figures from two schools having mixed groups were not included. In the schools included, the racial groups were practically pure. The number of corrections was proportionately greater in the Mystic and Wyman than in the Noonan and Lincoln schools. Out of a total of 834 defects in the first-named schools, 423 (51 per cent) were corrected. In the other schools out of 1,203 defects, 270 (22 per cent) were corrected.

TABLE I

PER CENT OF THOSE EXAMINED WHO SHOWED DEFECT, BY SCHOOLS

	Privileged Group			Less Privileged Group		
	Mystic Per Cent	Wyman Per Cent	Total Per Cent	Noonan Per Cent	Lincoln Per Cent	Total Per Cent
Nutrition	5	11	8	7	13	10
Posture	22	11	15	25	19	22
Tonsils	12	8	9	30	27	28
Adenoids	12	8	10	30	27	28
Teeth	12	9	10	47	49	48
Heart	9	6	7	10	15	12½
Eyes	32	18	24	38	35	36½

The Lincoln School showed a significantly larger number of defective teeth, tonsils, adenoids, and hearts; the Noonan a significantly larger number of defective teeth, tonsils and adenoids.

Correlation of Defects—The figures showed a positive correlation between defects of teeth and eyes, teeth and posture, teeth and tonsils, and teeth and adenoids, posture and nutrition, tonsils and adenoids, and tonsils and heart. This indicates that if a child has one defect he is likely to have other defects, and that there probably exists some fundamental condition underlying all his defects. The correction of the defects removes the inconvenience caused by the defect, but may probably have no effect upon the underlying conditions causing the defects.

TABLE II

NUMBER HAVING CERTAIN COMBINATIONS OF DEFECTS

	Eyes	Posture	Tonsils	Adenoids	Nutrition	Heart
Teeth	127 (100*)	116 (84)	122 (68)	117 (68)	57 (48)	50 (36)
Eyes		86 (81)	81 (65)	77 (65)	43 (46)	33 (35)
Posture			66 (55)	67 (55)	123 (39)	36 (29)
Tonsils				244 (44)	32 (31)	38 (23)
Adenoids					28 (31)	36 (24)
Nutrition						20 (17)

* Number expected according to the theory of independence.

Defects and Grade—Defects of nutrition and posture tended to develop with advancement in grade while defects of teeth and eyes were corrected. In the first grade the percentage of defective eyes was more than twice that found in the 7th and 8th grades and the percentage of defective teeth almost three times that in the 7th and 8th grades. The eye test was that given by teachers using the E chart, and was therefore very crude. The same test, however, was used for all children, and therefore the possibility of error was the same for all.

TABLE III

PER CENT OF THOSE EXAMINED WHO SHOWED DEFECTS IN GRADE

Defect	1st Grade Per Cent	2d–6th Grade Per Cent	7th–8th Grade Per Cent
Nutrition	5	11	23
Posture	18	19	33
Teeth	41	34	14
Tonsils	22	18	14
Heart	8	9	12
Eyes	51	26	25

Defects and Retardation—The first grade was the one most frequently repeated. The repeaters showed a higher percentage of defects than the non-repeaters, the percentage of repeaters showing defects of posture and teeth being significantly greater.

TABLE IV

PER CENT REPEATING EACH GRADE

No. of Children in Grade	Grade	Per Cent Repeating
1361	1st	10
1182	2d	5
1002	3d	5
805	4th	5
628	5th	7
473	6th	4
308	7th	1
148	8th	3

TABLE V

PER CENT OF THOSE FOUND TO HAVE DEFECTS AMONG REPEATERS AND OTHERS

Defect	Repeaters Per Cent	Others Per Cent
Nutrition	15	12
Posture	31	19
Teeth	37	23
Tonsils	22	17
Heart	12	9
Eyes	31	29

Further study only will show whether the conclusions based on these figures are sound. So many other factors also enter into retardation that careful investigation is necessary to determine the

relative importance of each. This is particularly true in the 1st grade where children are entering a new environment and are obliged to adapt themselves to hitherto unknown conditions. The mental defectives are weeded out from grade to grade, which naturally lessens the number of retarded children in the upper grades. Language difficulties may be a cause of retardation.

Other interesting questions are raised by the study. Is there a real correlation between posture and retardation? Does the attitude of mind causing the failure also cause the poor posture or does the physical condition underly the failure? Are the findings in Table VI of sufficient importance to warrant further study?

TABLE VI

ALL CHILDREN IN PRIMARY OR ELEMENTARY GRADES WHO HAVE REPEATED OR ARE TO REPEAT 1ST GRADE

Three Schools—(Not Giving I. Q.)

CAUSES OF RETARDATION AS GIVEN BY TEACHERS

1. No cause—immaturity—"backwardness"	52
(Of these 23 were Italians)	
2. Sickness	13
3. Needed glasses	2
4. Frequent absence	3
5. Deficiency in reading	6
6. Other reasons	8
Total repeating 1st grade	84

Two Schools—(Keeping I. Q. as Obtained in Group Tests)

CAUSES OF RETARDATION AS GIVEN BY TEACHERS

1. No cause—"backwardness"		24
I. Q. not given	5	
I. Q. from 76–87	7	
I. Q. from 90–100	5	
I. Q. from 100–117	7	
2. Sickness		4
3. Frequent absence		1
4. Needed glasses		1
5. Other reasons		2
Total repeating 1st grade		32

Defects and Absence—The figures did not show that defects of nutrition, teeth, tonsils, heart, or eyes were more common among children who were absent from school. This included absence from any cause.

The median number of days absent of those with normal nutrition was 7.0, with defects of nutrition 5.6; with normal teeth 7.3, with defective teeth 5.4; with normal tonsils 6.8, with defective tonsils 6.2; with normal heart 6.9, with defects of heart 5.6; with normal eyes 5.7, with defective eyes 7.2.

TABLE VII

TOTAL ABSENCE

Cause of absence	Days Absence
Colds *	6,415
Other communicable diseases	1,816
Diseases of digestive tract	503
Sickness other than above or kind not stated	2,584
Absence due to causes other than sickness	2,850
Total days of absence	14,168

* The term "cold" as used here is used in the ordinary meaning of the term among lay people.

CONCLUSIONS

1. There was no association between sex and defects or the frequency of defects.
2. Children in the less privileged group showed a greater number of defects with fewer corrections than those from the more privileged group.
3. Defects of nutrition and posture increased with advancement in grade, while defects of eyes and teeth were corrected.
4. The figures showed a correlation between defects of posture and teeth and retardation. But the study does not bring out all the factors.
5. The figures did not show any correlation between defects and absence from school for any cause.
6. These findings were obtained in a town with a mixed population where environmental conditions are excellent and where there is a good school health program.

Relief to the Hurricane Districts

A REPORT of the Red Cross relief operations in districts recently affected by the West Indies hurricane shows that the organization has been active in Florida, Porto Rico and the Virgin Islands. Relief was hurried to the stricken area immediately and a minimum fund for care of the suffering was estimated at $5,000,000. In about a week an amount totaling $1,369,000 was raised by state chapters throughout the country, except in South Dakota and Nebraska, where a fund campaign is being carried on to take care of the sufferers of recent tornadoes in those states.

It was estimated that 15,000 families were made homeless in the entire area, but this report probably did not completely cover the Lake Okeechobee region. Food, clothing, camp and tent equipment were hastened to the stricken areas.

The Florida State Board of Health is in charge of all sanitary activities, and reports that rather favorable conditions prevail along the eastern coast. West Palm Beach reports a good water supply and is shipping water to points outside the city. All milk is being distributed from Miami. On the other hand the sanitary conditions around Lake Okeechobee have been serious due to the unburied bodies of people and animals and the continued flooded condition of the land. The State Board of Health was assisted by the Red Cross and the National Guard in disposing of the dead and cleaning up the flooded regions. Public health nurses from various districts of Florida and Georgia assisted the contingent of Red Cross nurses detailed to the relief work. Typhoid serum has been offered to the Florida State Board of Health and to the Red Cross. In the Virgin Islands the sanitary situation is well in hand, but in Porto Rico the situation is more serious.

Vision Survey Among a Group of Pupils of Syracuse Schools

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Syracuse, N. Y.

THE care of the vision of the school children is a responsibility that must be assumed by school authorities as well as by the parents. Many times the fact that a child has poor vision is not discovered until he enters school.

The age at which the vision of school children should be tested, and the methods which should be used, have been matters of considerable discussion. Whether the school physician in his routine examination is able to find the cases of eye defects requiring the attention of an oculist has also been questioned. In our effort to determine these points and to make studies of other factors bearing on visual comfort, a staff was specially formed and equipped to make a study in Syracuse schools. Schools were chosen in which there were children of varied nationalities and economic home conditions.

The study was conducted under the direction of the author, with the assistance of one physician full-time and one part-time. The nurse located in the school in which the work was being done also assisted. A clerk recorded findings. The study was begun October 15, 1926, and completed May 31, 1927.

A Snellen test card at a distance of 20 feet was used. This was illuminated by direct light greater than 10 foot-candle power. This test was later supplemented by a Snellen test card mounted on a board, to the upper edge of which was attached an electric fixture similar to that used on desk lamps. A 50 candle power frosted bulb threw the desired amount of illumination down upon the chart. This apparatus, which proved most satisfactory, was designed in the Department of Health Supervision of School Children, and was assembled in the vocational department of one of the schools.

In addition to the Snellen test card an Ives acuity apparatus * was used. The illumination is a part of the apparatus and therefore of constant intensity. This apparatus measures vision numerically in tenths, with "one" equivalent to normal, or approximately 20/20 on the Snellen test card. However, after examining 1,499 pupils with

* Loaned by the Bausch & Lomb Optical Company, Rochester, N. Y.

the Ives acuity apparatus and finding that the results obtained corresponded very closely with the results obtained from the use of the Snellen test card, the use of the Ives acuity apparatus was discontinued as unsatisfactory for school work for the following reasons:

1. The test is entirely subjective. For this reason it is necessary to depend upon the reply of the pupil in taking the vision. In the second year coöperation was unsatisfactory in some cases and below the second year coöperation could not be expected.

2. The instrument is so large it is not easily transported.

3. The instrument is very expensive and therefore could not be a part of the equipment of each school.

The Snellen test card, mounted on a board and illuminated with a 50 candle power bulb, is much more satisfactory than the Ives acuity apparatus for use in the schools for the following reasons:

1. The Snellen test card is objective and what the pupil can read is visible to the examiner.

2. The Snellen test card has the advantage of being interchangeable for use in examining pupils who do not know the letters. In this instance the illiterate E chart has proved very useful, especially in the kindergarten grades.

The vision of each eye of the pupil was determined in the examination. Where the pupil was wearing glasses the vision was taken with and without glasses. The test was made first with the Snellen test card. In the first 1,499 pupils examined, the Ives acuity apparatus was used in addition to the test with the Snellen test card.

Following the vision test the lids were everted and inspected, pupillary reflexes tested to light, the cornea examined, muscle balance tested as to relationship of the two eyes, and an examination of the interior or fundus of the eyeball was made. Through this examination it was learned whether it was some pathological condition or abnormality of the eyeball itself which interfered with vision or whether the difficulty was due to refractive error, such as far-sightedness, near-sightedness, astigmatism or a combination of any of these.

A history chart, filled in by the pupil examined, presented a record of symptoms and a history of previous diseases, or conditions that might affect vision. The record furnished by this chart and the result of the vision test were correlated in determining the further treatment of each case.

The standard of poor vision will be understood to be a vision of 20/40 or less. Pupils with a vision of 20/40 or less, and pupils with a vision of 20/30 or better who presented symptoms of asthenopia, were referred for further investigation. Since we find cases where an individual has a vision of 20/30 and in which there is found a refractive error of small degree which would not account for the vision being less than 20/20, we designated 20/30 as the upper limit of normal. A

TABLE I

PUPILS WHOSE VISUAL ACUITY WAS DETERMINED AND NUMBER REFERRED FOR REFRACTION

School	Nationality	Economic Conditions	Number Enrolled	Pupils Examined	Pupils with Poor Vision	Percentage with Poor Vision	Pupils with Asthenopia	Percentage with Asthenopia	Total Number Referred for Refraction	Percentage Referred for Refraction
Brighton	American	Good	458	432	44	10.2	37	8.5	81	18.7
James Street	American (mixed)	Good	823	767	64	8.3	51	6.6	115	15.0
Jefferson	Italian	Fair	474	391	53	13.5	9	2.3	62	15.8
Lincoln	American	Very Good	990	944	68	7.2	61	6.4	129	13.6
Seymour	American (mixed)	Poor	931	874	112	12.8	83	9.5	195	22.3
Sumner	American	Good	640	613	41	6.6	32	5.2	73	11.9
			4,316	4,021	382	9.5	273	6.7	655	16.3

pupil with vision of 20/30 and with no symptoms was not routed for refraction. The cases which were routed for refraction and further examination were given the card used in the schools advising parents to consult the family physician or an oculist.

Of the 4,060 pupils examined 3,910 were cases of hyperopia; 142 were cases of myopia, and 8 were cases of mixed astigmatism which is a type of myopia. Among the 4,060 pupils examined 63, or 1.5 per cent, were afflicted with strabismus or cross-eyes. Of these 63 cases, 26 were referred for refraction, 3 of whom were already wearing glasses.

Of the total number of 4,060 pupils examined, the visual acuity of 39 could not be determined because of lack of coöperation. Among the 4,021 pupils were 11 who had poor vision because of disease to some part of the eyeball and 1 pupil who had lost an eye. There were 10 cases of defective color vision. It is possible that if these cases had been further investigated, it might have been found due to color ignorance rather than to color blindness.

Since poor vision alone is not the only reason for the need of re-

TABLE II

NUMBER REFERRED FOR REFRACTION—BY SCHOOL AND SEX

School	Pupils Examined	Boys Examined	Boys Referred for Refraction	Percentage Boys Referred for Refraction	Girls Examined	Girls Referred for Refraction	Percentage Girls Referred for Refraction
Brighton	432	215	33	15.3	217	48	22.1
James Street	767	394	54	13.7	373	61	16.3
Jefferson	391	202	26	12.8	189	36	19.0
Lincoln	944	492	71	14.4	452	58	12.8
Seymour	874	464	92	19.8	410	103	25.1
Sumner	613	335	41	12.2	278	32	11.5
	4,021	2,102	317	15.0	1,919	338	17.6

fraction and the use of glasses, a search was made for symptoms of weak vision or asthenopia brought on by unusual use of the eyes, even where the vision may have been normal. Table I shows, by schools, the number of pupils whose visual acuity was determined and the number referred for refraction and Table II shows, by school and sex, the number referred for refraction. These figures indicate that the percentage of girls referred for refraction is slightly greater than that of boys, 17.6 as compared with 15 per cent. Table III shows the number at the various ages referred for refraction. These figures, as would be expected, show in the older age groups a gradually increasing percentage of children in need of refraction. Table IV shows the number referred for refraction in the various grades.

To aid in determining whether scholarship is affected by vision, a chart termed "psychological chart" was made by the teacher for each pupil. This chart gave the number of failures, if any; the scholarship rating; the intelligence or mental ability; industry or desire of the pupil to work; and the intelligence quotient of the pupil.

Scholastic records were available in the cases of 3,894 pupils. Of this number, 1,207, or 31 per cent, failed at least once. There were 2,207 pupil failures, or an average of 1.8 failures per pupil who failed. There were 2,035 boys, of whom 713, or 35 per cent, failed; and 1,859 girls, of whom 494, or 26.6 per cent, had failed at least once.

In reviewing the records of failures in the schools and the number of failures per pupil who failed, we find the highest rate occurring in the Jefferson School, where the parents of the pupils are mostly foreigners and the economic conditions are only fair. Under these circumstances there is usually little opportunity for assistance at home.

TABLE III

NUMBER REFERRED FOR REFRACTION—BY AGE

	Total	5	6	7	8	9	10	11	12	13	14	15	16	17
Number examined	4021	181	362	479	427	493	484	529	408	314	241	79	21	3
Number referred for refraction	655	14	26	60	71	74	81	104	76	72	54	20	3	-
Percentage	16.3	7.74	7.18	12.5	16.6	15.0	16.7	19.6	18.6	22.9	22.4	25.3	14.3	-

TABLE IV

NUMBER REFERRED FOR REFRACTION—BY GRADES

		Grade											
	Total	Kgn.	1st	2d	3d	4th	5th	6th	7th	8th	9th	Deaf	Ung*
Number examined	4021	122	512	536	510	548	524	481	309	273	143	10	33
Number referred for refraction	655	8	36	83	97	81	95	99	72	51	15	3	15
Percentage	16.3	6.56	7.0	15.5	19.0	14.8	18.1	20.6	23.3	18.7	10.5	30.0	28.3

* Ungraded classes

TABLE V

PERCENTAGE OF REGISTRATION WITH ONE OR MORE FAILURES—BY GRADES

	Grade											
Percentage of Failures	Ung.	Kgn.	1st	2d	3d	4th	5th	6th	7th	8th	9th	Total
Boys with normal vision	90.5	—	16.1	32.8	36.9	26.	44.8	43.2	37.4	35.3	39.3	34.3
Boys with defective vision	63.6	—	18.2	24.4	50.	35.	54.3	42.	40.	43.5	37.5	39.2
Girls with normal vision	78.5	—	15.4	20.8	27.	27.6	28.1	29.5	34.6	28.7	29.8	25.
Girls with defective vision	57.1	—	7.1	30.9	40.4	36.6	32.7	35.7	30.7	40.7	20.	34.2
Total Registration	77.7	—	15.66	27.6	34.3	34.	37.35	37.5	35.6	34.	34.3	31.

Of the 655 pupils referred for refraction (see Table III), scholarship ratings were available in 638 cases. These are shown in Table VI.

TABLE VI

SCHOLARSHIP RATING AMONG PUPILS WITH DEFECTIVE VISION

		Rating Poor or Fair		Rating Good or Excellent	
Number Recorded		Number	Per Cent	Number	Per Cent
Total	638	289	45.3	349	54.7
Boys	307	144	46.9	163	53.1
Girls	331	145	43.8	186	56.2

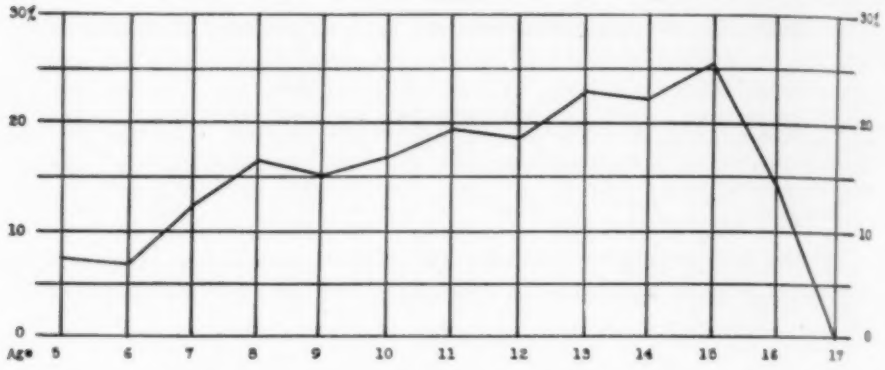
It would appear from the figures and from observations, that the greatest factor influencing scholarship among pupils is the intelligence of the pupil and his desire to work, rather than the fact that he has poor vision. The records indicate that if the pupil is willing and anxious to learn and has the ability to retain knowledge, even though his vision may be poor, his scholarship is of the average or better.

By means of the foot-candle meter the amount of illumination in the schoolrooms was measured, and with the exception of one school it was found to be of sufficient degree to meet the standard requirements of 5 foot-candles. However, we do not believe this is sufficient to provide proper illumination for the pupils seated farthest from the windows even on bright days. In the newer schools it was found that the proportion of window space to the size of the rooms and the placing of the seats to avoid shadows were excellent. Despite this, however, on dark days when artificial light was required, illumination in the rooms was poor. It was impossible to learn the conditions under which the pupil must work in preparing his lessons at home.

An examination of the books in the classrooms showed that with few exceptions glazed paper was used. There is no paper so troublesome to vision and visual effort. In many cases the print was entirely too small and very little attention had been given to spacing.

Another source of great annoyance was the reflection from polished desk surfaces. It would seem that the comfort of the pupil would be increased and visual effort decreased if desk surfaces were finished dull.

FIGURE I—PERCENTAGE OF PUPILS EXAMINED REFERRED FOR REFRACTION—BY AGES



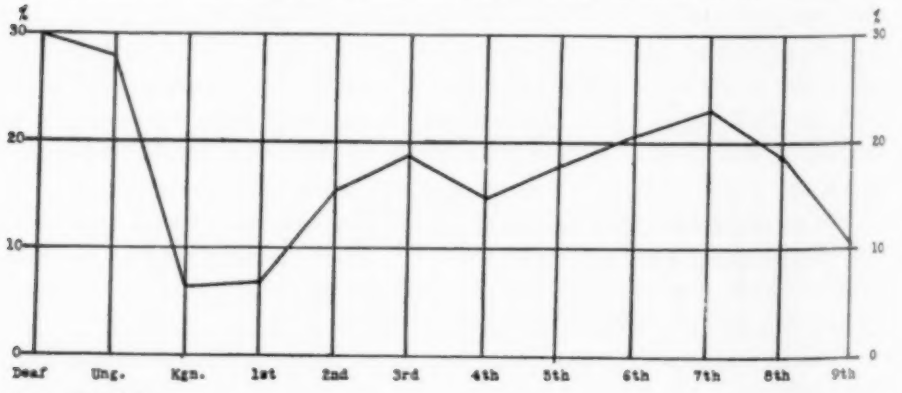
It would also aid in decreasing visual effort if the blackboards were given a dull finish. It is suggested that, until blackboards are finished with a dull surface, soft chalk be used.

SUMMARY

Of the 4,021 pupils whose visual acuity was determined, 1,499 were tested with both the Snellen test card and the Ives visual acuity apparatus. The results corresponded most favorably and justified the continued use of the Snellen test card because of its adaptability to all conditions, and the discontinuance of the Ives visual acuity apparatus because of the inconvenience involved.

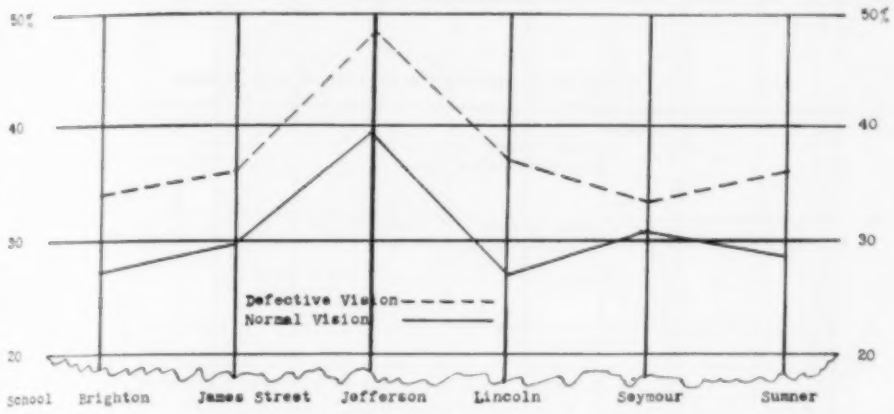
Of the 4,021 pupils whose visual acuity was determined, 382, or 9.5 per cent, were referred for refraction because of poor vision and 273, or 6.7 per cent, because of asthenopia. A total of 655, or 16.3 per cent, were referred for refraction.

FIGURE II—PERCENTAGE OF REGISTRATION REFERRED FOR REFRACTION—BY GRADES



Ung. - Ungraded
Kgn. - Kindergarten

FIGURE III—PERCENTAGE OF FAILURES AMONG PUPILS WITH NORMAL VISION AND DEFECTIVE VISION—BY SCHOOLS



There is a steadily increasing number with defective vision from the early years with a condition of progressive myopia.

The general consensus of opinion has been that scholarship is affected by poor vision. The higher percentage of failures among pupils with poor vision would bear out this belief (Figure III). The fact that the higher percentage of failures occurs among pupils of both sexes with poor vision would tend to strengthen this assumption (Figure IV).

However, a further study of the relationship between failures and defective vision shows the higher percentage of failures to have occurred among the boys of whom there were but 15 per cent referred for refraction as compared with 17.6 among the girls (Figure V).

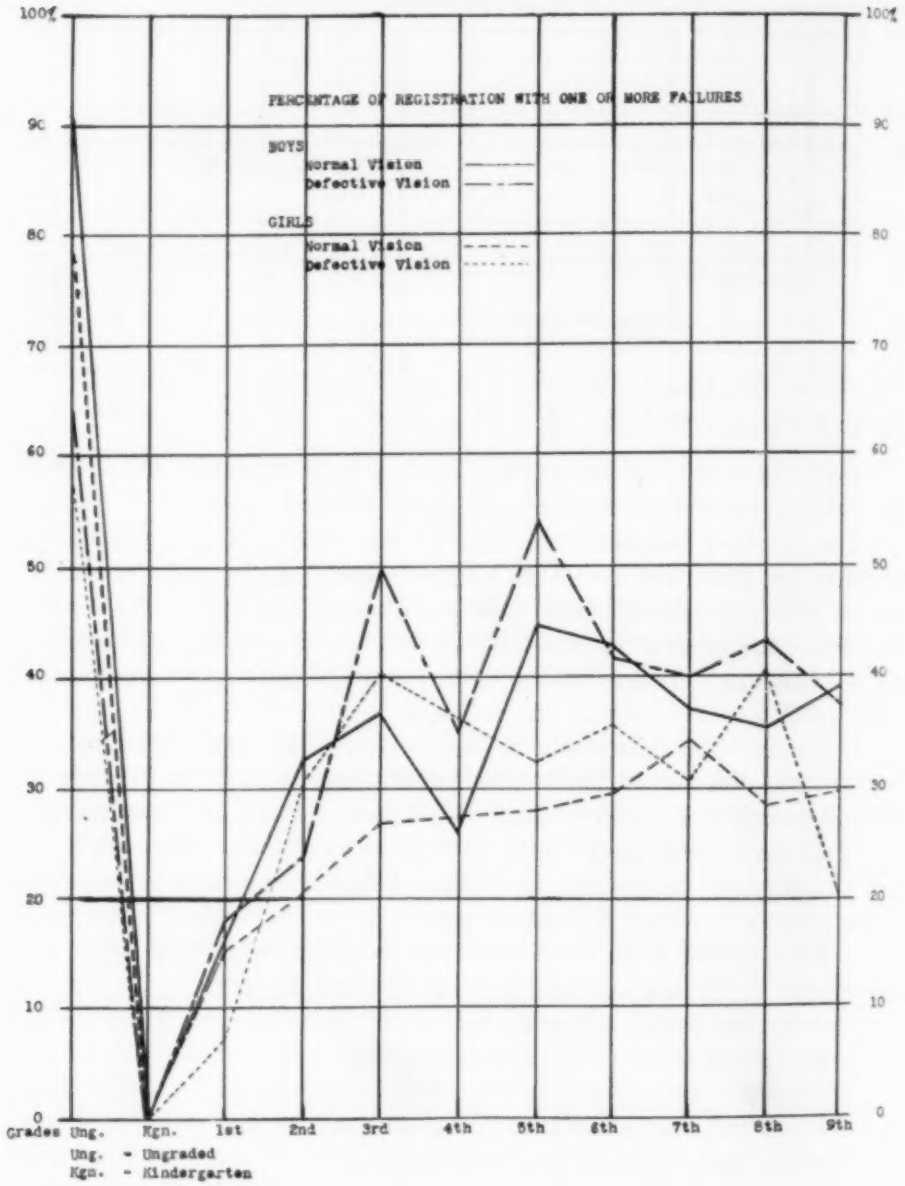
The highest percentage of pupils of both sexes was referred for refraction at Seymour School (Figure VI). The highest percentage of failures among both sexes occurred in Jefferson School where the nationality is Italian and the home conditions are poor.

Among the pupils referred for refraction the higher percentage occurred among those with good or excellent scholarship.

We believe the charts shown present a comparable study of the relationship between defective vision and scholarship and justify our conclusions that other factors influence scholarship as much or more than poor vision and asthenopia, and that poor scholarship is due more to lack of mental ability than to poor vision or asthenopia.

As a result of our study of the relationship of light to the comfort of the school child, it was found that even in the most modern schools conditions are still far from perfect. Bright days are the exception rather than the general rule in Syracuse and we believe that additional indirect lighting should be added to the direct lighting of the rooms.

FIGURE IV



The study cannot be considered complete until the results of our examinations are checked a year later. At that time the pupils who were referred for refraction will have had the benefit of the examination and correction. It will also be an opportunity to learn just how many cases have improved in scholarship and industry as a result of this correction.

FIGURE V—PERCENTAGE OF FAILURES AMONG PUPILS REFERRED FOR REFRACTION BY SEX AND SCHOOL

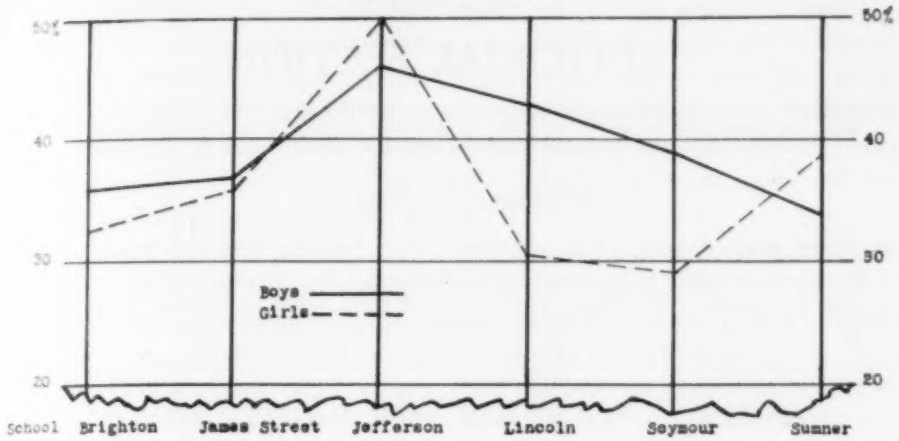
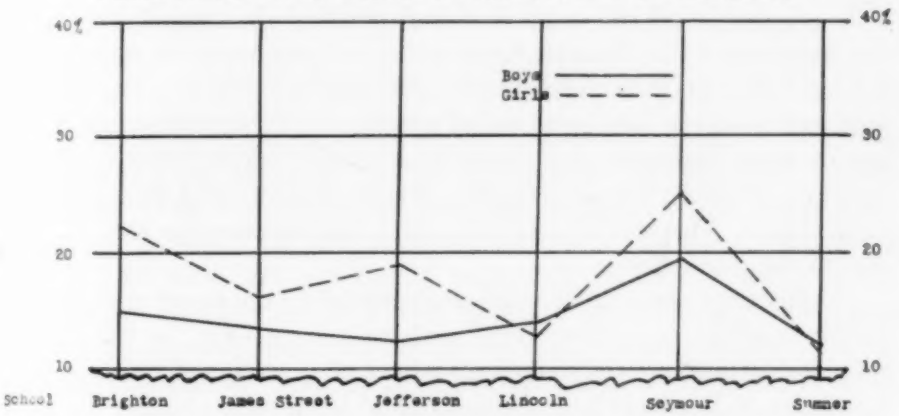


FIGURE VI—PERCENTAGE REFERRED FOR REFRACTION—BY SEX AND SCHOOL



RECOMMENDATIONS

1. That the examination of vision be emphasized as a part of the routine physical examinations in the schools by the school medical supervisor.

2. That besides taking vision at the regular intervals of physical examinations vision also be taken once a year of all the other pupils.

3. That the school nurse be taught how to take and record vision tests.

4. That the apparatus for making vision tests be made standard in all the schools in Syracuse, and that this apparatus be the Snellen test card, mounted according to design in the Department of Health Supervision of School Children and as assembled in the vocational department of the schools.

5. That conditions of lighting the schoolrooms be investigated with a view to improving them.

6. That blackboards and desk tops be finished with dull surfaces to prevent eye strain.

7. That the school textbooks be investigated from the standpoint of visual effort.

EDITORIAL SECTION

Expressions of opinion and statements of supposed facts are published on authority of the writer under whose name they appear, and are not to be regarded as expressing the views of the American Public Health Association, unless such statements or opinions have been adopted by vote of the Association.

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PULLING TOGETHER FOR CHILD HEALTH

A NEW feature of the Annual Meeting in Chicago this year is the occurrence at the same time and place of the annual meeting of the American Child Health Association. Community of interest has led our Child Hygiene Section and this large voluntary association to join hands in the presentation of programs of common appeal. In one or more instances also these sessions are participated in by the Sections of Public Health Nursing, Health Officers and Public Health Education. This action lends strength and richness to the program and to the discussions.

Neither the identity nor independence of thought and action of the participating groups is interfered with by this step and, on the positive side, understanding and singleness of purpose are greatly enhanced.

Great strides have been made in child hygiene in the last 20 years. In fact, the child hygiene program might be called a product of the 20th century. Proceeding along individual lines, divergence in methods and procedures in different communities has been inevitable. The great problem facing the child health worker is so to unravel the connecting threads of cause and effect in order to enable him to identify the activities which are effectual and to distinguish them from efforts that are imposing and theoretically justifiable, but whose results are relatively inconsequential.

These joint programs give a wide array of contributions from leaders in the field of maternal and child hygiene. So accustomed have we become to declining death rates, such as in tuberculosis, diphtheria, and infant mortality, that the failure of a specific cause of death to conform to this tendency challenges our attention. One of the factors that has been particularly difficult to overcome is maternal deaths.

An entire session is given over to this subject. Here the obstetrician, the gynecologist, the official and unofficial health worker, have the opportunity to pool their experiences and seek a strengthened union of effort. Infant hygiene, preschool health supervision, medical, dental and nursing service, and educational methods in health are topics of other sessions which will be discussed from many angles. Out of this exchange of ideas are bound to arise clarification of thought and renewed incentive to productive effort.

A perusal of the preliminary program of the joint meetings discloses that there is an increasing tendency toward critical self-analysis and research—research into the fundamentals. There is also evident an earnest desire to perfect organization and eliminate waste motion. Further, it is apparent that a finer discrimination is being exercised as to what findings from the bacteriological and the social laboratory are suitable for wide application in health practice.

PERMANENCY OF TENURE

AMONG the oldest interests of the American Public Health Association is the attainment of permanency of administrative tenure. It has long been recognized that with frequent shifting of administrative heads continuity of program and satisfactory service for local and state health work are practically impossible. The development of effective community health service depends upon sound policies and practices, well established and accepted generally by the public. Time and steadfastness of purpose both are requisites of community education. It is a matter of general comment that transient tenure, with its attendant political complications and vacillating policies, is the most significant difference between health administration here, in the United States, and that in Europe.

There are enough splendid examples of great accomplishments by health officers who have directed state or local services for continuous periods of twenty-five years or more, to prove the applicability of the principle under our form of government; yet many cities and states continue the wasteful and inefficient practice of changing health officers with every change of general administration.

A committee of the Association, appointed within the year to study and deal with this question, will hold an open conference the first day of the Annual Meeting at Chicago to consider the many aspects of the problem and to receive suggestions as to how such a committee may effectively serve the members of the Association.

This is a question vitally affecting every member of the Association, and to the solution of which all should contribute thought and influence. Your active support of the Committee on the Permanency of Tenure is a necessity.

APPRAISAL OF ADMINISTRATIVE PRACTICE

FOR many years health officers had no special standard by which to judge the efficacy of their work. It is true that conferences were often held, and our own Association, for many years composed almost entirely of health officers, held discussions and doubtless all taking part in them were benefited by the experiences of others. Nevertheless there was no uniform practice and no standard of appraisal, a lack felt by health officers themselves perhaps more keenly than others, though recognized by all interested in the betterment of health administrative work.

Various schemes were devised for the measurement of certain activities, the first one being a score card for dairies, devised about 1903 for use in the District of Columbia. This was soon followed by others, mostly for the grading of dairies and milk supplies, but the first form which covered a wide range of public health work was put out by Dr. Chapin in 1914. Finally in 1920, the American Public Health Association appointed its Committee on Municipal Health Department Practice, and in 1923 the first draft of the Appraisal Form was prepared. In 1925, the Appraisal Form was issued by our Association for experimental use by the health officers of cities. This form with slight modifications has had extensive trial, one of the most notable being the Health Survey of 86 Cities, conducted by the American Child Health Association.

Up to the present, the Appraisal Form has been employed in some two hundred cities varying in size from fifteen thousand up to one and a quarter million inhabitants, and distributed over a large part of the country. These, as well as many other facts concerning the Appraisal Form, have been published from time to time, and are now collected in one volume which is reviewed in this issue of our JOURNAL.[1]

Doubtless, the great majority of health officers have followed the development of this method of appraisal, but all will welcome the searching criticism which has been made of its validity, and everyone will be glad to know that we now have an objective measure of the value of public health practices.

The use of the Appraisal Form has passed beyond the experimental stage. Its value has been proved both in practice and by scientific

analysis. Its wider use can be recommended without hesitation. We may also state with assurance that the revision contemplated for the present year will further increase its practical value and confirm the validity of the fundamental principles involved.

1. *The Validity of the Appraisal Form as a Measure of Administrative Health Practice.* (See p. 1324.)

A NEW VIEW OF SMOKING

ONE of the standard gags perpetrated at meetings of scientific men is calling attention to the lack of ventilation and other breaches of sanitary law which may almost always be observed. There is generally truth in the statements made, and frequently the fault lies as much with the building as with the sanitarians who are discussing the welfare of the human race and what should be done or left undone to prolong life. Tobacco smoking in meetings has always, as far as the observations of the writer go, passed unnoticed. There are doubtless a number of persons who object to tobacco smoke and who would prefer to have smoking prohibited, since it is disagreeable to many persons, irritates the throats of others, and sometimes is so thick as to interfere with lantern slide demonstrations, which are bad enough at best, since they usually involve almost complete blocking of ventilation. However, smoking is usually passed by in silence, whatever may be the opinions of certain members of the audience, for several reasons, the chief one being the fear of being considered a crank, while the habit is so general that one feels hopeless of making any change.

These considerations make an address recently given in England particularly noticeable. Before the Southern Branch of the Society of Medical Officers of Health, Dr. Druitt was speaking on smoke abatement from the standpoint of health. A large part of his time was devoted to tobacco smoke and the pollution of the atmosphere produced by it.

While acknowledging the absence of statistics to prove his point, he held that such pollution was at least on "speaking terms" with several serious causes of mortality, among which he mentioned tuberculosis, pneumonia and bronchitis. He further quoted observations indicating not only that the wives of heavy smokers do not produce as many healthy children as those of nonsmokers, but also that the proportion of males is less.

Whatever doubt we may have of the correctness of the observations and the conclusions drawn therefrom, it is certainly inconsistent for health officers and sanitarians who are discussing problems of atmospheric pollution, ventilation, etc., to sit for hours in rooms filled

with tobacco smoke. Surely they, above all others, should set a good example.

The subject is one of particular interest at this time when our daily papers, even those published at universities, give pictures of society women, movie stars and even aviators, who select one brand or the other of cigarettes blindfolded, owing to its alleged superior qualities, and when singers give certificates for other brands because of the soothing effect on the vocal cords, and when the tobacco habit is apparently becoming prevalent among women. That tobacco is a narcotic poison is a statement not disputed by anyone in authority. The late Sir William Osler called attention to the fact that a number of puzzling cases in women in England which were new to the average physician proved to be due to the increase of the smoking habit. The effects of tobacco on the heart, respiration, eyes and vocal cords have long been recognized.

"Scientific evidence is hardly needed to show that to some extent the person breathing a smoke-tainted atmosphere is liable to the same evils as the person who is smoking, for the experience of a non-smoker who has spent an evening in the atmosphere of a smoking concert is often that he sustains a disturbance of health similar to that sometimes complained of by the excessive smoker."[1]

We do not believe this is a major point in sanitary advance, but it is certainly worth our while to consider the facts.

1. *Lancet*, Apr. 26, 1913, p. 1181.

ASSOCIATION NEWS

THE A. P. H. A. MEETING

THE scientific program for the 57th Annual Meeting at Chicago this month contains several important symposia. Nearly all of the sessions of the Child Hygiene Section have been built around special topics such as: Maternal Mortality; Dental Hygiene; Efforts to Date to Define Objective Standards in Health Education.

Similarly, the Public Health Engineering Section program has symposia on the Sterilization of Milk Containers and Equipment; a program on Financing Water Supply and Sewerage Projects; a symposium on the Disposal of Phenol Wastes; and one on Shellfish Sanitation. Many others than the engineers will be interested in the reports of the Schoolroom Ventilation Studies which have been carried on in various cities.

Following the successful session on Epidemiology last year, a program of 7 papers on this subject has been prepared for this year. A special session will be held on the subject of Cancer Control. This program is being arranged by the President of the Association and Dr. Charles Mayo.

The recent widespread interest in undulant fever has been recognized by the Laboratory Section, which will present 6 papers on this subject.

In response to the demands from many members of the Association who are active in rural areas, the Health Officers Section has provided a special program on Rural Health Practice.

The importance of accidents as a public health problem will be dealt with in the first session of the Vital Statistics Section.

The Public Health Education Section, continuing its popular luncheon sessions, has devoted two entire sessions to the consideration of the desirable steps in planning a health education publicity program.

The Preliminary Program of the meeting, which was printed in the September issue of the JOURNAL, lists about 200 papers and reports. The list of authors represents a large proportion of the public health authorities in America.

EXHIBITS

The Tenth Annual Health Exhibit of the Association will be held as part of the 57th Annual Meeting. This exhibit is twice as large as any exhibit ever sponsored by the Association in previous years. The members of the Association and delegates to the meeting will find it most advantageous to visit this exhibit during the morning hours when it is restricted to them. It will be open to delegates from 9 A.M. to 1.30 P.M. and from 5.00 to 7.00 P.M. In the afternoon and evening the exhibit is open also to the public, closing at 10.30 P.M.

Nearly all of the exhibitors who have been with us in past years will also have displays at Chicago, with much new material to show. This year, too, there are a large number of new exhibitors offering a variety of services to the professional public health worker.

In addition to this exhibit, there is a scientific exhibit on the third floor, open to delegates only, and this will include the exhibit on Administrative Practice,* which was so successful last year.

A complete list of the administrative methods being exhibited and the cities or organizations exhibiting will be found on page 1289. Twenty-six separate exhibits are planned to cover the

* The exhibit on Administrative Practice which is a part of the Scientific Exhibit is made possible through the financial assistance of the John Hancock Life Insurance Company and the Milbank Memorial Fund.

fields of general health administration, child hygiene, communicable disease control and epidemiology, health education, organization of state and county health service, sanitation and roadside water supplies, public health demonstrations, Indian nursing service and accident prevention.

The purpose of the exhibit is to acquaint the health officer with new developments, or new ways of doing old jobs, and to present in concrete form information concerning these methods, which will enable the health officer to judge of its applicability to his own local community and organization.

The Committee on Administrative Practice which sponsors the administrative features of this exhibit will appreciate suggestions regarding subject matter and method of display.

If you are interested in spreading information about any phase of public health or public health activities, you are invited by the Public Health Education Section to visit frequently the Education-Publicity Headquarters.

Making statistics graphic, a new type of posters, the latest in diphtheria materials, annual reports, contest ideas, campaign outlines and materials, devices for getting attention and holding it, and examples of good publicity of various types will be features of the display.

The committee in charge will answer questions and offer consultation on health education problems and plans. The committee suggests that you bring along with you a supply of your business cards, with a number written on each one, and when you return home you will receive free copies of such selected items as you indicated you wish to have.

Associations holding related meetings with the A. P. H. A. have also planned special exhibits. The American Child Health Association has arranged an exhibit to interest those attending the meeting in its organization and program.

The important place which social hygiene should occupy in the public health program will be indicated by the exhibit which the American Social Hygiene Association will display at the meeting.

The display will include a new set of statistical charts which has been worked out by the Medical Division of the A. S. H. A., showing the relative prevalence of venereal diseases in the United States and Great Britain, with interesting figures on the influence of efforts to control these diseases. Some of the exhibit material on syphilis, gonorrhea in the male, and gonorrhea in the female which has been shown by the association at annual meetings of the American Medical Association also will be on view in Chicago.

In order that "he who runs may read" the A. S. H. A. will distribute at the exhibit booth small packets containing information about the purpose and scope of its program. Much interest has been evidenced in the reading lists, which are among the circulars included in these free envelopes.

Copies of the books and pamphlets on the control of venereal diseases, social hygiene legislation and sex education will be available for examination at this booth.

A copy of the association's film "Public Health Twins at Work," revised, with up-to-date statistics, will be shown with the films which the National Health Council is displaying at the conference. Information regarding other social hygiene films which the association distributes will be available at the exhibit booth. The attendants will be prepared to discuss any social hygiene problems with which sanitarians are confronted.

BOOK EXHIBIT

The seventh annual exhibit of new books on public health, arranged under the auspices of the Book Service of the Association, will be well worth several

visits. It will be found in Wall Exhibit D in the exhibit hall. More than 60 publishers are sending their newer books for the display aggregating 500 volumes. The Book Exhibit has been arranged for the entertainment and education of delegates, as well as to help those who desire to purchase the latest titles in preventive medicine, laboratory methods and findings, food, drugs and nutrition, mental hygiene, social hygiene, health books for children, etc. You are invited to spend as much time as you can at the Book Exhibit. There will be an experienced librarian in charge, who will be glad to answer your questions and advise you in the selection of the best and newest books.

SCIENTIFIC EXHIBIT

Third Floor, North Assembly Room Corridor and South Assembly Room

Booth Number	*Administration*
17	Administrative Methods—Charleston, S. C.
16	Visible Record Display Cabinet—Columbus, O.
14 & 15	County Health Centers—County Health Department, Los Angeles, Calif.
	Child Hygiene
3	Blue Ribbon Campaign—Sidney, O.
4	Children's Bureau—Washington, D. C.
1	School Health Examination—Racine, Wis.
2	Summer Preschool Round-up—Newkirk, Okla.
5	Infant Welfare Clinics—Cleveland, O.
	Communicable Disease Control and Epidemiology
6	Typhoid Carriers and Cream Cheese Epidemic—Minnesota State Health Department.
7	Septic Sore Throat Epidemic—Massachusetts State Health Department.
13	Communicable Disease Control—Manchester, N. H.
12	Communicable Disease Record Forms—Providence, R. I.
10	Diphtheria Control—Niagara Falls, N. Y.
11	Diphtheria Prevention—Lexington, Ky.
8 & 9	Diphtheria, Measles and Rabies Control Methods—Detroit, Mich.
	Health Education
26 & 27	Health Education in Clinics—New York Tuberculosis and Health Association, New York, N. Y.
25	Public Health Education—American Medical Association, Chicago, Ill.
18	Vital Statistics—Health Department, Chicago, Ill.
	Laboratory
22 & 23	Microscopic Slide, Precipitation Test—Mt. Sinai Hospital, Cleveland, O.
	Organization
20	County Health Organization—Pontiac, Mich.
21	Organization and Functions—Illinois State Health Department.
	Sanitation
29	Roadside Water Control—Pennsylvania State Health Department.
	Accident Prevention
28	Accident Prevention—National Safety Council.
	Health Demonstrations
24	The New York Health Demonstrations. Cattaraugus County, N. Y.—Syracuse, N. Y.—Bellevue-Yorkville, New York, N. Y.
	Nursing
30	Indian Nursing Service—Minnesota State Health Department.

RELATED MEETINGS OF A. P. H. A. IN CHICAGO

This year 9 public health organizations will hold related meetings with the A. P. H. A. when it convenes at Chicago, October 15–19, for its 57th Annual Meeting.

The preliminary program published in the September issue of the JOURNAL announced the time and place of joint sessions and individual meetings of a few of the organizations scheduled.

In addition to these the following have announced their dates of meeting:

International Association of Dairy and Milk Inspectors (17th Annual Meeting), October 11, 12, 13, Hotel Stevens.

Association of Women in Public Health, Dinner Meeting, October 17, Hotel Stevens.

Conference of State Sanitary Engineers, October 13–15, Hotel Stevens.

State Laboratory Directors Association, October 15, 10.00 a.m. and 1.30 p.m., Luncheon Meeting, Hotel Stevens.

MEETING OF AMERICAN ASSOCIATION OF SCHOOL PHYSICIANS

HOTEL STEVENS

Monday, October 15, 9:30 A.M.

Welcome Address. DR. ARNOLD H. KEGEL, Commissioner of Health, Chicago, Ill.

Standards for Medical Inspection and Health Service in Teacher Training Institutions (Report of Committee). DR. A. O. DEWESSE, Kent State Normal College, Kent, O.

Discussion. DR. GRACE S. WIGHTMAN, Illinois State Health Department.

Educational Qualifications for School Physicians. DR. HAVEN EMERSON, New York, N. Y.

Standard Forms and Methods in School Medical Inspection. DR. J. BRUCE MCCREARY, Pennsylvania State Health Department, Harrisburg, Pa.

When Should We Operate on Tonsils? DR. PORTER B. BROCKWAY, Toledo, O.

Open Air School Ventilation. DR. L. W. CHILDS, Cleveland, O.

One hour of each session will be devoted to brief reports by school physicians doing outstanding work.

2:00 P.M.

1. **A Model School Medical Inspection Program.**
   (a) *In First Class Cities.* DR. JOHN A. CECONI, Boston, Mass.
   (b) *In Second Class Cities.* DR. F. S. BURKE, Toronto, Ont.
   (c) *In Third Class Cities.*
   (d) *In Rural Communities.* DR. B. T. MCDOWELL, Canandaigua, N. Y.
2. **Mental Hygiene in Education.** Suggestions to School Physicians. DR. CLINTON P. MCCORD, Albany, N. Y.
3. **How Can the Nurse Best Assist the School Physician?** HELEN F. MCCAFFREY, R.N., Boston, Mass.

Dinner Session, 6:30 P.M.

Selection and Management of Cardiopathic Cases. DR. SVEN LOKRANTZ, Los Angeles, Calif.

The Important Contributors to a School Health Program. CLAIR E. TURNER, Dr.P.H., Cambridge, Mass.

Medical Leadership in School Medical Inspection and Health Service. DR. HAVEN EMERSON, New York, N. Y.

DR. J. S. FULTON, MARYLAND'S HEALTH OFFICER, RESIGNS

Maryland's success in developing its public health program has been due to a great degree to the efforts of John Samuel Fulton, M.D., who, after 30 years' service, has resigned as health director of Maryland.

Dr. Fulton was born in Fremont, O., in 1859.

He was appointed State Health Officer of Maryland, September 17, 1896.

In 1898, Dr. Fulton secured the appointment of Dr. William H. Welch as a member of the State Board of Health, in which capacity he is still serving, and he was president of the board until the reorganization of the entire state government by the Governor of Maryland in 1922. Since January 1, 1923, when the reorganization became effective, Dr. Welch has been a member of the board of health and Dr. Fulton has been the director and chairman of the board.

As a result of legislation passed in 1904 requiring the registration of all living cases of tuberculosis, Maryland

was the first state to register cases of tuberculosis. Other states followed Maryland's example.

Following the enactment of this law, Dr. Fulton brought about the first tuberculosis exhibition held in Maryland in the spring of 1904. It was at this exhibition that a few leading persons interested in the subject of tuberculosis formed what proved to be the nucleus of the National Tuberculosis Association.

In 1906, Dr. Fulton was elected Secretary-General of the Sixth International Congress on Tuberculosis, which was held in Washington in 1908.

The committee, selected to make plans for the Fifteenth International Congress on Hygiene and Demography in Washington in 1912, named Dr. Fulton as its head.

Dr. Fulton was President of the Conference of State and Provincial Health Authorities of North America in 1905. During the World War he enlisted in the Medical Reserve Corps, U.S.A., and became Lieutenant-Colonel. He served full time at headquarters in Washington and also carried on the activities of the State Department of Health after office hours. He has been Professor in State Medicine at the University of Maryland Medical School and lecturer in the Johns Hopkins School of Hygiene and Public Health. He is a member of the American Association for the Advancement of Science, National Tuberculosis Association, Hygiene Reference Board of the Life Extension Society, Inc., Honorable Member of the Royal Hungarian Society and a Fellow of the Royal Institute of Public Health, Great Britain. He is a Fellow of the American Public Health Association.

No doubt one of the greatest tributes paid to him comes from his fellow workers for the last quarter of a century, expressed in a resolution made by the State Board of Health on receipt of his resignation last May from the directorship of the public health of Maryland.

JOHN SAMUEL FULTON, M.D.

Dr. Robert H. Riley, who was trained by Dr. Fulton, was appointed as his successor.

DR. C. O. SAPPINGTON APPOINTED BY NATIONAL SAFETY COUNCIL

C. O. Sappington, M.D., Dr.P.H., has been appointed Director of the Division of Industrial Health at the National Safety Council, Chicago, Ill. This division has just been created, and Dr. Sappington is the first director.

DR. J. H. SHRADER JOINS NATIONAL DAIRY PRODUCTS CORPORATION

J. H. Shrader, Ph.D., Director, Bureau of Chemistry and Food, Health Department, Baltimore, Md., has accepted the presidency of the Research Laboratories of the National Dairy Products Corporation, Inc. Dr. Shrader's resignation from the Baltimore Health Department became effective August 31. The new laboratories will be located in Baltimore and the work there will be

directed toward the improvement of dairy products. Dr. Shrader is Chairman of the Food, Drugs and Nutrition Section of the American Public Health Association.

DR. LINSLY R. WILLIAMS LEAVES N. T. A. DR. KENDALL EMERSON HIS SUCCESSOR

Linsly R. Williams, M.D., since 1922 Managing Director of the National Tuberculosis Association, has resigned, his resignation to take effect October 1. Because of the increasing pressure of work in the several professional and public health activities in which he is engaged Dr. Williams decided several months ago that as soon as his successor could be found he would leave the N. T. A.

Dr. Williams is director of the New York Academy of Medicine, president of the New York Tuberculosis and Health Association, and a trustee of Columbia University. He is a Fellow of the American Public Health Association. Since 1904 he has been a member of the Board of Managers of the New York Association for Improving the Condition of the Poor. Following his service during the World War as assistant division surgeon of the 80th Division, Dr. Williams was made director of the Rockefeller Tuberculosis Commission in France. In 1914, he retired from the practice of medicine to accept the appointment of deputy commissioner of the New York State Department of Health in which capacity he served until 1917. Dr. Williams has been connected with the Vanderbilt Clinic of the College of Physicians and Surgeons, Columbia University, for several years and has been associated with several sanatoria for tuberculous patients. He was also one of those responsible for the creation of the New York Milk Committee.

Dr. Kendall Emerson of Worcester, Mass., has been elected to succeed Dr. Williams as Managing Director of the N. T. A. Dr. Emerson is a graduate of Amherst College and of Harvard University Medical School. He has been active in the national tuberculosis program for several years, having served consecutively as chairman of the Worcester, Mass., County Tuberculosis Association, director of the Massachusetts Tuberculosis League, president of the league and representative director of the N. T. A., becoming member of the executive committee of the association last year. During the World War Dr. Emerson served with the Royal Army Medical Corps and the U. S. Army Medical Corps, later going to Siberia for the Red Cross. For two years after the armistice he acted as deputy commissioner and director of the medical service for Europe in Paris under the direction of Robert F. Olds.

DR. M. M. SEYMOUR RESIGNS FROM PROVINCIAL HEALTH POST

Maurice McDonald Seymour, M.D.C.M., D.P.H., LL.D., whose activities in the public health work of Canada for more than 20 years have brought him prominence among sanitarians in the United States and Canada, has resigned as Deputy Minister of Health of the Province of Saskatchewan. Dr. Seymour has reached the retirement age but he will be retained by the provincial government as adviser on health matters until November.

Dr. Seymour is a Fellow of the American Public Health Association and served as vice-president of the Association for one year. He has also served as president of the Canadian Public Health Association. With the establishment of the Department of Health of Saskatchewan in 1922, Dr. Seymour was appointed deputy minister, thus becoming a member of the Dominion Council of Health. In 1926 he was elected president of the Conference of State and Provincial Health Authorities of North America.

Dr. Seymour was chosen in 1923 to represent Canada on the Health Section of the League of Nations and with representatives of 18 other countries made a health survey of the United States, after which Europe was visited and the representatives attended a conference at the League headquarters in Geneva. In 1920 he was made a Fellow of the Royal Institute of Public Health in England.

Dr. Seymour was born in Goderich, Ont., in 1857 and received his early education at Assumption College, Sandwich, Ont. He was graduated from the medical college of McGill University in 1879 where he received his degree of M.D.C.M. He obtained his degree of Doctor of Public Health from the University of Toronto. Ottawa University conferred upon him the degree of LL.D.

He was appointed Commissioner of Public Health for the Province of Saskatchewan in 1906 and in that same year he was instrumental in organizing the Saskatchewan Medical Association.

Dr. Seymour has always taken a keen interest in the fight against tuberculosis and through his foresight and by his energy the Saskatchewan Anti-Tuberculosis League was organized and the first tubercular sanatorium in that province was built.

MAURICE M. SEYMOUR, M.D.

MEETINGS OF AFFILIATED SOCIETIES

Society	Secretary	Place and Time of Annual Meeting
Connecticut Public Health Association	Richard W. Pullen, M.D.	
Massachusetts Association of Boards of Health	Stephen L. Maloney	Boston, January 24, 1929
Michigan Public Health Association	W. J. V. Deacon, M.D.	
Missouri Public Health Association	R. L. Laybourn	Jefferson City, April or May, 1929
New Jersey Public Health and Sanitary Association	Edward Guion, M.D.	Princeton, December 7–8, 1928
New Mexico Public Health Association	Paul S. Fox	Carlsbad, May, 1929
Northern California Public Health Association	William P. Shepard, M.D.	
Ohio Society of Sanitarians	E. R. Shaffer, M.D.	Columbus, November 7, 8, 9, 1928
Pennsylvania Public Health Association	William C. Miller, M.D.	Altoona, February, 1929
Southern California Public Health Association	H. A. Young	
Texas Association of Sanitarians	E. G. Eggert	San Antonio, November 7–10, 1928
Virginia Public Health Association	P. S. Schenck, M.D.	
West Virginia Public Health Association	Ellis S. Tisdale	Morgantown, November 27–29, 1928

NEW MEMBERS

Edna Abbott, Roanoke Rapids, N. C., School Nurse

Leon Adler, Indianapolis, Ind., Manager National Motion Pictures Company (Assoc.)

Lyda W. Anderson, R.N., Detroit, Mich., Executive Secretary Michigan State Nursing Association

Gean S. Atkinson, M.D., Muskogee, Okla., Superintendent of Health, Muskogee County

Alphonse Barabe, M.D., Riviere du Loup, Quebec, Canada, Health Commissioner

George D. Beal, Ph.D., Pittsburgh, Pa., Assistant Director Mellon Institute of Industrial Research

J. B. Berteling, M.D., South Bend, Ind., Hea'th Officer

Patrick C. Bruno, Revere, Mass., Agent Board of Health and Milk Inspector (Assoc.)

Frank H. Collins, M.S., Sioux City, Ia., Commissioner of Public Health

Oscar Costa-Mandry, San Juan, P. R., Associate in Bacteriology, School of Tropical Medicine, University of Porto Rico

Marion E. Davey, S.B , Toledo, O., Nutrition Teacher, Toledo District Nurse Association

Fernando del Pino, M.D., Havana, Cuba, Director of Hospitals and Asylums

Hampton W. Edwards, M.D., Frazer, Ky. (Assoc.)

Lacy H. Elrod, B.S., Nashville, Tenn., in charge of Health Department, Central Church of Christ

Howard R. Estes, B.S., New York, N. Y., Staff Associate American Child Health Association

Guillermo Lage y Fernandez, Havana, Cuba, Auxiliary Supervision of Foods and Drugs

William I. Fishbein, M.D., Chicago, Ill., Physician, Laboratory Schools, University of Chicago

Alfred H. Fletcher, B.S., Monroe, La., Assistant Sanitary Engineer, State Board of Health

J. M. Frazier, M.D., Belton, Tex., Teacher of Physiology, Hygiene and Bacteriology, Baylor College

Joe Gilbert, M.D., Austin, Tex., Member State Board of Health

O. O. Hammonds, M.D., Oklahoma City, Okla., State Health Commissioner

William L. Hart, M.D., Chicago, Ill., Medical Inspector, U. S. Army

Wilbur M. Heaton, Pueblo, Colo. (Assoc.)

John A. Henderson, Wyandotte, Mich., Director of Health Education

Juan A. Hernandez, Havana, Cuba, Civil Engineer, Department of Public Health

Clarence F. Holtegel, M.D., Paintsville, Ky., Director Johnson County Health Unit

Edgar B. Kay, C.E., Washington, D. C., Consulting Engineer, Pittsburgh-DesMoines Steel Company

Emily L. Ketcham, M.S., Syracuse, N. Y., Supervisor of Nutrition, Department of Health and Syracuse Health Demonstration

Anna Koch, R.N., Greenfield, Mass., Director Visiting Nurse Association

Francisco P. Lopez Silvero, M.D., Havana, Cuba, Chief, Health Department

Daisy Manley, Hartford, Conn., Staff Nurse

William C. Marti, B.S. in C.E., Chicago, Ill., Principal Chemist, Department of Health

Fred Moore, M.D., Des Moines, Ia., Director Health Department of Public Schools

Sharajit K. Mukerjee, Calcutta, India, Director of Physical Education, Y. M. C. A. (Assoc.)

S. Weir Newmayer, M.D., Philadelphia, Pa., Supervisor Medical Inspection of Schools

P. R. Outlaw, M.D., El Paso, Tex., Health Officer

Wesley W. Polk, B.S., Evanston, Ill., Superintendent Water Department

Grace H. Pollock, A.B., Pittsburgh, Pa., Nutrition Department, Pittsburgh District Dairy Council

Alonzo A. Ross, M.D., Lockhart, Tex., Member State Board of Health

Rafael F. Santa Maria, Havana, Cuba, Meat Inspection Supervisor

Warren J. Scott, Hartford, Conn., Director Bureau of Sanitary Engineering, State Department of Health

Richard G. Soutar, Jr., M.D., Sacramento, Calif., Director Public School Health Department

Marjory Stimson, B.S., New York, N. Y., Assistant to Director, National Organization for Public Health Nursing

Ruth Strang, Ph.D., New York, N. Y., Research Associate, Teachers College, Columbia University

Sidney Strauss, M.D., Chicago, Ill., Secretary Chicago Heart Association (Assoc.)

C. J. Taugher, M.B., Milwaukee, Wis., Bacteriologist

Florence E. Taylor, Walton, N. Y., School and General Public Health Nurse

Vsevolod E. Timonoff, Leningrad, U. S. S. R., Member Board of Public Health Congresses (Assoc.)

Robert B. Watson, B.S., C.P.H., Newark, N. J., Industrial Secretary New Jersey Tuberculosis League

Ruth Watson, New York, N. Y., Director Education Department, Royal Baking Powder Company
Paul L. Weir, B.S. in C.E., Atlanta, Ga., Bacteriologist, Water Works
Emanuel J. Wexler, M.D., Niles, Ill., Commissioner of Health
E. W. Wright, M.D., Bowie, Tex., Member State Board of Health
Howard E. Wright, M.D., Princeton, N. J., School Medical Inspector

APPLICATIONS FOR FELLOWSHIP

PUBLIC HEALTH EDUCATION SECTION: Richard O. Beard, M.D., Minneapolis, Minn.
PUBLIC HEALTH NURSING SECTION: Elizabeth L. Smellie, R.N., Ottawa, Ont.

NEW A. P. H. A. BOOK LIST

The new *Catalogue of Health Books* of the A. P. H. A., carrying 773 titles, is ready for distribution. The Book List this year includes 53 more titles than the list of 1927. It suggests titles in the fields of child, maternity and school hygiene; food, nutrition and drugs; health education; industrial hygiene; laboratory; mental hygiene; nursing; personal hygiene; preventive medicine and public hygiene; public health engineering; social hygiene and eugenics; tuberculosis; vital statistics; reference and medical history.

This bibliography on public health is prepared for the purpose of aiding the public health worker to find the sources that will be most helpful to him in his special field of work. In the preparation of this list the American Public Health Association does not assume the responsibility of endorsing these titles—the list is compiled only as a suggested bibliography. However, a committee on public health books, which includes specialists in every field listed in the bibliography, have given assistance in its compilation, and the Association is grateful to them for their suggestions.

The publishers' output this year has, to a degree, influenced the increase of titles appearing in the following sections of the bibliography: Preventive Medicine; Laboratory; Mental Hygiene; Personal Hygiene; Child, Maternity and School Hygiene; Health Education; Nursing; Reference Books and Medical History.

The new book list will be mailed to members of the A. P. H. A. and distributed at the Book Exhibit at the 57th Annual Meeting at Hotel Stevens, Chicago, Ill., where selection of the books listed may be made.

DEATHS OF A. P. H. A. MEMBERS

John Archibald Smith, Secretary of the American Heart Association since February, 1928, died suddenly on August 20. Dr. Smith was Secretary of the New York State Department of Health from 1917 to 1921.

Cressy L. Wilbur, M.D., for many years one of the most widely known vital statisticians in the world, died on August 9, 1928, of pneumonia. He served as Chief of the Division of Vital Statistics of Michigan, 1893 to 1905, and, as Chairman of the American Public Health Association Committee on Vital Statistics, secured the government's adoption of the International Classification of Causes of Death.

Edward A. Holmes, M.D., Health Officer of Colchester, N. Y., since 1901, died on August 19, 1928. Dr. Holmes also served as Health Officer of Downsville, N. Y., since May, 1921.

PUBLIC HEALTH ADMINISTRATION

HENRY F. VAUGHAN, D. P. H.

Preventive Medicine—The need of effectively controlling cults and pseudo "practitioners" of medicine by enlisting the coöperation not only of the medical profession, but also the leaders of community thought, is emphasized. Development of public health administration in this country has not infrequently been of the hit-and-miss type, resulting in a crazy quilt pattern of administration. Even in the large cities the health administrator is frequently one who has not qualified as a student in public health science and has but infrequently obtained the degree conferred upon those who study in our better grade institutions of learning. Governmental guidance would do much to prevent such haphazard development in the administrative field and would be effective in preventing many needless epidemics such as the Montreal typhoid situation of last year. The Federal Department of Health might very well have the effect of establishing a standard in public health work analogous to the service that is rendered by the Bureau of Standards with respect to basic weights and measurements. The position of the administrator in England is a striking contrast to the chaotic condition that prevails in this country. A more effective and wholesome respect for public health work can be inculcated into the medical profession by the teaching of preventive medicine at medical centers.—Louis I. Harris, M.D., Proposals for the Next Steps in Preventive Medicine and Public Health, *J. A. M. A.*, XCI: 529 (Aug. 25), 1928.

Control of Typhoid Fever—In the monthly bulletin of the New Haven Department of Health for August, 1928, the story of typhoid fever in New Haven is traced from the year 1873 down to date. It shows that in those early years, 1873, 1874 and 1875, unquestionably typhoid was due in a large measure to the filthy condition of the soil of the city from privy vaults and the drainage of these vaults finding its way into wells. It was not until 1893 that the Common Council passed an ordinance compelling the sewer connection of all premises, or abolishment of all privy vaults and cesspools on sewered streets within 50 feet of any house. In 1896, the first milk epidemic was recorded. In 1901, 696 cases and 101 deaths from this disease occurred in the city, most of which were traceable to the pollution of Lake Dawson, a reservoir of the water supply, by the washing of excreta from the watershed into this reservoir. Milk infection from two different farms was reported in 1906, and 1911 showed a milk infection traced back to a privy vault. In 1914, all privy vaults on sewered streets were ordered abolished, and in 1915 a typhoid carrier was found in one of the wards. In the years 1915 to 1917, other equally dangerous vaults were found to be centers of summer typhoid and were abolished. Likewise in 1924 and 1927 a cesspool and an old privy vault temporarily used as a comfort station were found to be centers of infection.

Thus, the bulletin concludes, it has come to pass that the main paths of the causes of typhoid fever have been increasingly blocked by administrative action eliminating privy vaults, cesspools, and wells, and by throwing all known safeguards upon milk production. Further, a public service corporation, the New Haven Water Company, has made all storage drinking water adequately safe by clearing all the watersheds of any inhabitant.

In this review of New Haven's typhoid history there is a summary of the administrative practices which health officers must continually keep in working order to protect their communities.

Goiter Prevention—The author concludes that there is no basis for the statements that iodized salt may induce hyperthyroidism. The etiology of hyperthyroidism lies within the individual. These etiological factors are increased or aggravated by endemic goiter, and by preventing endemic goiter we are thereby preventing, in the future, many cases of hyperthyroidism. These conclusions are the result of a goiter survey of school children made in 4 counties and several urban communities in Michigan in 1924, and a re-survey in 1928. Iodized salt has been in rather general use in this state during that period. In Midland County it was found that of 3,645 school children examined in January, 1924, 41.6 per cent had goiter. A re-survey in January, 1928, showed that 91 per cent of the homes of the public school children used iodized salt. The incidence of goiter among children had decreased to 8.8 per cent. In Wexford County the first examination showed 55.5 per cent to be goitrous and in the re-survey 17.3 per cent had goiter. In the city of Grand Rapids, 1923, 30 per cent of 26,215 pupils had goiter, while a re-survey showed the percentage of goiter of 9. It was found that 91 per cent of the homes of public school children were using iodized salt.

The author analyzes the effects of iodized salt on adults with goiter and concludes that there is no indication of any danger from the use of such salt.—O. P. Kimball, Efficiency and Safety of the Prevention of Goiter, *J. A. M. A.*, XCI: 454 (Aug. 18), 1928.

Cancer Control—A special study has been made of the methods of cancer treatment and control in 20 average American cities ranging in population from 100,000 to one million. It was recommended that the records of cancer cases should be pooled through individual follow-up reports or through a central bureau embracing the hospitals of the city. Also, there should be more concentration on the laboratory diagnosis of cancer, especially in smaller communities. Cancer clinics, to function properly, must be carefully established and must proceed slowly. There should be physicians having a proper pathological understanding of cancer, capable of treating cancer or developing into experts. In some of the large hospitals it would be well to refer cancer cases to groups of certain physicians on the staff who have the time and inclination to study such cases. In some communities it would be better if early cancer were not treated, the patients being sent instead to a nearby center where facilities and the opportunity for wide experience with the disease are more easily obtained.—Harry C. Saltzstein, M.D., Average Treatment of Cancer, *J. A. M. A.*, XCI: 465 (Aug. 18), 1928.

LABORATORY

C. C. YOUNG

COMPARATIVE RESULTS IN THE BACTERIOLOGICAL EXAMINATION OF FECES

AUBREY H. STRAUS, FELLOW A. P. H. A., and FORREST SPINDLE

Laboratories, Virginia State Department of Health, Richmond, Va.

THE excellent results obtained by the use of brilliant green bile in the bacteriological examination of feces published by Havens[1] has naturally attracted much interest among public health laboratory workers. As most public health laboratories have for some years employed the method described by Teague,[2] that is, the use of 30 per cent glycerine, the question has naturally arisen as to which of these two methods would give the most satisfactory results under practical working conditions.

In an endeavor to determine this point a series of comparative specimens has been obtained. Dr. Havens was kind enough to supply us with brilliant green bile prepared in his laboratory for this purpose. Two different batches of brilliant green bile were received and used, but Dr. Havens has subsequently stated that the dye used in this media was from one of the poorest lots he has had. A special outfit for collecting samples was used containing two identical bottles, one of which contained 30 per cent glycerine and the other brilliant green bile, approximately the same amount of fluid, 8 to 10 c.c., being put into each bottle. These containers were supplied to our epidemiological department and also to our county health officers. They were requested when obtaining specimens of feces to put as nearly as possible the same amount of material into each bottle, the specimens then being mailed to the laboratory. The quantity of feces used was in most cases quite small, about the size of a pea.

Upon arrival at the laboratory the specimens were immediately plated, successive platings being made the day following arrival and the day after that, so that each specimen was plated on three successive days. The specimens from the glycerine were plated only on eosin-methylene-blue agar, this being the usual custom in this laboratory. The specimens in the brilliant green bile, however, were plated both on eosin-methylene-blue agar and on Krumwiede's brilliant green agar according to the method described by Havens. That is, we endeavored to follow Havens' technic exactly on the brilliant green bile specimens, at the same time plating them also on eosin-methylene-blue agar for comparative purposes.

While large numbers of these containers were sent out, up to the present time only 52 specimens have been returned to the laboratory. The specimens came from 34 cases of suspected typhoid fever, 5 cases of suspected dysentery, 12 suspected carriers and 1 of unknown origin. All positive specimens came from clinical cases.

The results of these 52 comparative tests are as follows:

Specimens Examined	
52	
Number Positive for Typhoid	
(a)	(b)
Brilliant green bile	Glycerine
10	18

One specimen found positive by method (a) was negative by (b), but 9 specimens positive by method (b) were negative by (a). There were likewise 3 cases of Flexner dysentery found positive by method (b), which were not found by the brilliant green bile method.

It is also interesting to note that the specimen positive in the brilliant green bile only was likewise positive only on the brilliant green agar plates, the eosin-methylene-blue plates being negative. In one other case positive colonies were obtained from the brilliant green agar and not on the eosin-methylene-blue, but in all other cases the eosin-methylene-blue plates gave excellent results.

Thirteen specimens from the brilliant green bile showed no growth on any plate. In no case was there any evidence of overgrowth.

In all 3 cases showing Flexner dysentery no growth was obtained from the brilliant green bile, while positive results were obtained from the glycerine at the end of three days, the plates showing almost pure cultures of dysentery bacilli.

SUMMARY

The bacteriological examination of feces in the State of Virginia is carried out both for diagnosis and for the finding of carriers. Bacillary dysentery is more common than typhoid fever, and carriers of this disease are likewise, in our observation, more numerous than carriers of typhoid. Brilliant green bile is not suitable for the examination of specimens for bacillary dysentery. It, likewise, did not in this series give as good results in the examination for typhoid as did 30 per cent glycerine.

While it is realized that this series of results is small they are nevertheless significant and the examinations have been made under practical working conditions. It is, therefore, our opinion that 30 per cent glycerine is decidedly superior to brilliant green bile as a practical method in public health practice.

REFERENCES

1. Havens and Dehler. *J. Lab. & Clin. Med.*, 10:238, 1924; *A. J. P. H.*, 16:948, 1926.
2. Teague and Clurman. *J. Infect. Dis.*, 18:653, 1926.

A SIMPLE DILUTION BOTTLE STOPPER ARRESTOR

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A SIMPLE dilution bottle stopper arrestor can be made by means of a small piece of 6 mm. glass rod. By bending the glass rod into a series of suitable angles, as shown in Figure I, and inserting one end into the single opening of a one-holed No. 2 rubber stopper, the appliance is complete.

The original purpose of devising such an appliance was to permit the preparation of dilutions of ice cream samples by weight. By means of suitable carrier pans designed to hold one Pyrex dilution bottle each with load of 100 gm., it was found convenient to utilize a torsion balance sensitive to 0.01 gm. The stopper arrestor provides the means of maintaining the tare without the danger of contamination.

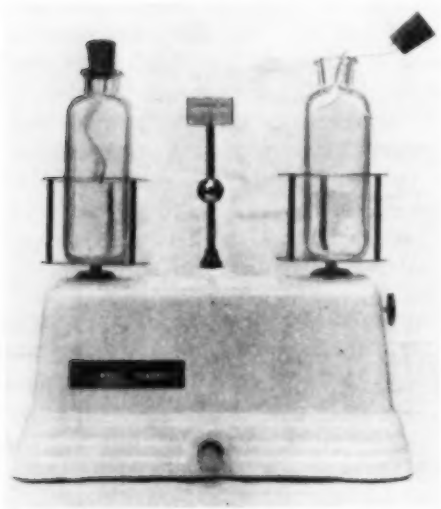
FIGURE I

STOPPER ARRESTOR FOR USE WITH PYREX DILUTION BOTTLE
(Half Size)

Reference to Figure II will demonstrate the ability of the stopper arrestor in the preparation of ice cream sample dilutions by weight without the danger of contamination.

In Figure II the Pyrex dilution bottle on the left shows the position of seal of the stopper and arrestor before and after dilution, while the bottle on the right indicates the positions of stopper and arrestor during diluting by weight. In our laboratory we prepare the dilution bottles with 90 c.c. of sterile distilled water and use 10 gr. of melted ice cream for preparing an original 1/10 dilution. All other dilutions are prepared from this original dilution.

FIGURE II



Courtesy of Torsion Balance Company

ASSEMBLED EQUIPMENT FOR PREPARATION OF ICE CREAM SAMPLE DILUTIONS BY WEIGHT

Additional advantages of the stopper arrestor have come to our attention with the use of this appliance. It was found that with the considerable ejection of non-absorbent stoppers during autoclaving, this could be reduced to a minimum by means of the arrestor, with never an instance of the stopper leaving the bottle entirely. A quick tap at the top of the stopper with a glass rod will invariably return the stopper to the position of seal, thus maintaining sterility. Furthermore, in the actual manipulations during diluting, plating, etc., it makes it possible to prepare and withdraw portions for plating without removing the stopper entirely from the bottle, thereby again reducing possibilities of contamination during the execution of the usual details of bacteriological laboratory technic.

VITAL STATISTICS

LOUIS I. DUBLIN, PH. D.

The Health of Calcutta—The latest available annual report of Calcutta is for the year 1925, published in 1927. Calcutta has an area of 30 square miles and a population of over a million; a birth rate of 19, a death rate of 33, and an infant mortality of 326. The population should therefore be decreasing by no less than 15,000 per annum. There are about twice as many males as females, and the death rate of females is nearly double that of males. The death rate of the Mohammedans is considerably higher than that of the Hindus, and the infant mortality of the former 429, against 306 of the latter. The birth rate when calculated from the number of women of childbearing age is 59 for Hindus, 65 for Mohammedans, 52 for Anglo-Indians and 61 for Indian Christians. There is a seasonal variation for births, the rates being low in summer and high in winter.

In 1925 there was a severe epidemic of smallpox of very virulent type, causing a death rate of 3.6 per 1,000. The disease of kala-azar has been increasing steadily during the past seven years.

The death rate from this is now seven times what it was 17 years ago. The disease is about twice as fatal in Anglo-Indians and native Christians as in Hindus and Mohammedans.—*Med. Off.*, 40: 25 (July 21), 1928.

Toxemia in Pregnancy—Over 70 per cent of the cases studied were primiparae, and more than 50 per cent were between the ages of 25 and 35 years. In a number of cases there was a family history of toxemia, most often of the patient's mother. Fibroids were noted in 5 cases. There were twins in 3 cases. Convulsions took place in 8 primipara cases and in 1 multipara, with one death, a primipara. There were 22 chronic nephritics with 3 deaths occurring among them. One hundred fifty-six pregnancies were recorded in 56 cases. Ninety-eight babies lived, and 61 pregnancies terminated in death to the fetus.

An analysis of 400 consecutive cases coming for delivery showed that 5.5 per cent developed toxemia. Of these, 4.25 per cent were acute toxemic cases and 12 per cent of the cases were recurrent toxemias. The toxemics who have had prenatal treatment and develop convulsions suddenly, because of an acute fulminating condition, have a better chance of surviving, if properly treated, than those who have not had this care.

Although toxemic symptoms should be treated in a hospital, operative intervention is not necessary unless symptoms increase. In toxemias developing prior to six and a half months, the danger of eclampsia is too great to allow the pregnancy to continue. Delivery before severe toxemia develops will reduce maternal mortality.—Reginald D. Margeson. *New England J. Med.*, 198: 735–739 (May 24), 1928.

Infant Mortality—Figures for New Zealand show that infantile mortality has fallen from 100 in 1880 to 40 in 1926; the deaths of infants 1–2 months, from 67 to 14; the deaths of infants under 1 month, from 29 to 25. But the stillbirths have risen from 23 to 30 since 1913. The increase of natal deaths is attributed to the diminishing birth rate, producing an increasing proportion of first births, and probably increasing the age of primiparae.

It has been proposed that infantile mortality rates be recorded in more detail, as follows: (1) Deaths of infants under 1 year per 1,000 live births; (2) Deaths from 1 to 12 months per 1,000 live births; (3) Deaths of infants under 1 year per 1,000 live births; (4) Stillbirths per 1,000 total births; (5) Deaths under 1 month together with stillbirths per 1,000 total births.

There are three groups of causes of early death, non-viability and disease of the embryo, damage by the process of birth, and post-birth disease. The first may cause death from the time of conception to the end of the first month of extra-uterine life; the second, during birth or within the first week of separate existence; the third, from the end of the first week onwards. Congenital syphilis is a cause of death, but recent research shows it to be less prevalent than is generally believed. Toxemia is assumed from the latest research to be a disease of the embryo, but it is for clinical purposes a maternal disease.—*Med. Off.*, 40: 11 (July 14), 1928.

Endemic Goiter in Massachusetts—In the fall and winter of 1925–1926, the Massachusetts Department of Public Health in coöperation with the U. S. Public Health Service conducted a goiter survey in 55 towns and cities of Massachusetts. There were 12,270 students examined for goiter. Seventeen and six-tenths per cent were found goitrous. The goiter rate among children whose parents were born in Russia is higher than for children of other parents. Tabulations show that there is no dif-

ference between the goiter group and the non-goiter group with respect to height, and only a slight difference in weight. The mean weight for children with goiter is slightly less than for those without. The presence or absence of communicable diseases such as chicken pox, measles, mumps, whooping cough, scarlet fever, poliomyelitis, rheumatism, convulsions and diphtheria, or the presence of enlarged tonsils, adenoids, cervical glands and dental caries, has no apparent effect on goiter incidence. Fifteen and seven-tenths per cent of the children with goiter, and 13.1 per cent of the children without had poor posture.

There were 39 places with information regarding iodine content of drinking water and goiter incidence. The correlation was not large, but consistent with the impression that lack of iodine content in water is to some extent responsible for development of goiter.—Carl R. Doering, Herbert L. Lombard and Fredrika Moore, *New Eng. J. Med.*, 199: 143–145 (July 19), 1928.

Vital Statistics of Germany in 1926—A report of the federal health bureau on the vital statistics of Germany for the year 1926 shows that the decline in the birth rate has continued on into 1927 and has led to the lowest rates ever recorded. Nor is the decrease in birth rate confined to the large cities, as is commonly assumed, but it is a manifestation under which also the rural districts are beginning to suffer to an alarming extent. In communes with 15,000 and more inhabitants, the number of legitimate living births in 1926 was only 13.3 per 1,000 inhabitants, so that for each marriage of that year there were only 1.6 living births, whereas the proportion for the whole reich in 1925 was 2.4, and in 1900 was about 4. The infant mortality, on the other hand, has been reduced. With a mortality of 10.1 per 100 living births, the death rate for 1926 reached the lowest recorded level. The mortality rate, on the average, for the decade 1901–1910 was 18.1 per 100 living births. Also the mortality of young children aged 1 to 5 was further reduced, one of the lowest death rates for that period of life in Europe being attained. In a comparison of the death rates of the cities and the rural districts, it appears that the large cities have the lowest infant mortality, whereas the mortality of children over 1 year of age is distinctly higher in the cities than in the small communes.

There was a marked decrease of tuberculosis mortality. The figure is only slightly higher than the minimum tuberculosis mortality for Europe, as recorded in Denmark and in England. Conditions are much less favorable with regard to scarlet fever; the number of cases and also the mortality show in 1926 a still further increase. Measles has abated greatly; diphtheria has retrogressed somewhat, while whooping cough presents an almost unchanged incidence. There was a notable increase in the number of cases of infantile paralysis—from 1,200 up to 1,614. Influenza showed a slight increase in the case morbidity, though, in the main, it is taking on again the character of a disease claiming its victims almost exclusively among the very young and very old, its manifestations being now much the same as before the war. Also the number of suicides, especially in the smaller communities, shows an increase.—*J. A. M. A.*, 91: 188 (July 21), 1928.

Poliomyelitis Work in Vermont—The 1927 Yearly Report of the After Care Division of Poliomyelitis shows that 954 patients were under supervision. Poliomyelitis cases when reported to the Department of Health are followed up first by the research worker, and then by after care nurses.

There were 183 new admissions and 878 clinical examinations made during the year. The charts show that the

number of patients under supervision has doubled since 1920, and that the number of patients seen during the year has almost tripled.

There were 40 new cases of poliomyelitis for the year. Thirty-five of these were seen. Thirty-one needed after care treatment, 2 were abortive, 1 was a practical recovery and 1 died. Of the 5 cases not seen, 1 was abortive, 2 were practical recoveries, and 2 died. The muscle involvement was high and the paralysis severe for the year. In the group of 31 cases under supervision there were 32 paralyzed legs. Twenty-four arms and shoulders were paralyzed, 5 of which were also practically flail, and showed little sign of recovery. Sixteen patients had considerable trunk paralysis.

Where recommended treatment was followed, patients, with the exception of those with completely paralyzed muscles, showed improvement in muscle strength. Even in the most severe cases deformities due to contractions had not developed. Craft work is taught to many of the patients, and it is reported that 3 have learned a craft that they can make and market themselves.—Charles F. Dalton, *New England J. Med.*, 198: 755–758 (May 24), 1928.

Epidemiology of Diphtheria—New-born infants of Schick-negative mothers are found to be Schick-negative, but at 9 to 12 months of age 90 per cent of infants are Schick-positive. The proportion found naturally Schick-negative increases progressively with age. The proportion of Schick-negatives is generally higher in urban than in rural populations, and higher for children in institutions and congested districts than in less crowded areas. Approximately 95 per cent of the institutional children between the ages of 10 and 14 in New York City were found to be Schick-negative, whereas only 72 per cent of the school children were negative.

In Auburn, N. Y., about 41 per cent showed negative tests; and in rural Vermont only 22 per cent of the school children were negative.

From 1922 to 1925, 9,000 white children under the age of 15 residing in six wards of Baltimore were Schick-tested. About 68 per cent were Schick-negative when they reached the age of 15; 52 per cent at the age of 10; and 21.5 per cent at the age of 5. About 12 per cent of the children aged 15 had had a previous attack of diphtheria. There is an average immunization rate of 6.1 per cent per annum in the second 5 years of life.

In white children the ratio of disease to bacteriologically demonstrable infection seems to vary according to the circumstances of exposure. In families in which a case of clinical diphtheria has occurred, it was found in Baltimore that of family contacts aged 5 to 14 (exclusive of those who have received prophylactic injectures of antitoxin), 4.33 per cent develop diphtheria within 30 days following the onset of the primary case. Of the contacts aged 5 to 14, 24.6 per cent become carriers of virulent bacilli without developing the disease. Therefore, among the children of this age exposed to infection by living in the house with a case of diphtheria, the ratio of carrier infection to clinical diphtheria is 6 to 1, whereas it has been found that in children exposed at school the ratio is 47 to 1.—W. H. Frost, Infection, Immunity and Disease in the Epidemiology of Diphtheria. *J. Prev. Med.*, 2: 325–343 (July), 1928.

PUBLIC HEALTH ENGINEERING

ARTHUR P. MILLER, C. E.

Report of Proceedings Eighth Annual Conference International Association of Street Sanitation Officials—As a part of the report of a committee to study costs and methods of various garbage disposal systems, there are included answers to circularized letters of inquiry which were mailed to about 200 cities in the United States. Tabulations are given showing pertinent facts relating to the methods of garbage collection and disposal now employed in these cities. It is stated that the essential features of an efficient garbage collection and disposal system include: (1) sanitation, (2) service, (3) economy, (4) dependability and flexibility, and (5) expediency. Various garbage disposal methods discussed include dumping, reduction, incineration, burial and plowing in and the Beccari process. This article is an excellent summary of the methods now employed in many of our larger cities. Jan., 1928, pp. 43–54. Abstr. W. L. Havens.

Treatment of Packing Plant Wastes—A description is given of the activated sludge plant operated by the Iowa State College Engineering Experiment Station at the packing works of J. E. Decker & Son, Mason, Ia., with an outline of operating experiences. The plant consists of a Dorco rotary screen, primary settling tank, two aeration tanks, secondary settling tank and a sludge re-aeration tank. Both settling tanks are of the Dorr type, equipped with thickeners. The average hourly flow varied from 200 to 490 g.p.m., dropping to 125 g.p.m. on Sundays. During periods of low flow, difficulties were experienced due to the primary settling tanks becoming septic, this condition giving rise to disturbances in the purification process. With a sludge return of 50 g.p.m., the theoretical detention period in the sludge re-aeration tank is 5½ hours. This tank, which was installed after the plant had been in operation some time, has effected a great improvement. The short period of aeration has little effect, however, when the sludge is septic. Increasing sludge return to 150 g.p.m. by returning sludge directly to the aeration tank during low flow periods has been found to facilitate the building up of a large amount of sludge for use when the flow increases.

One of the most troublesome factors encountered has been the rising of sludge in the final settling tank. This occurs when the sludge is under- or over-aerated, or slightly septic. Applying a continuous spray of water to the scum formed has been partially successful in causing the sludge to re-settle. Carefully controlling the air supply is the best method of combating this condition.

On some days extreme foaming has occurred in the aeration tanks, the foam at times covering the tanks to a depth of 6 ft. and the ground to a depth of 1 to 4 ft. for a distance of 50 ft. Foaming apparently occurs at certain intervals when the tanks are changing from an under-aerated to a fully aerated condition. Probably the most effective remedy would be either the use of oil in the tanks or the application of a flat, horizontal spray of water which would tend to cut the foam.

To correct unequal distribution of air the tanks were dewatered and cleaned. A heavy deposit of sand and organic matter was found on the entire bottom of the aeration tanks to a depth of 4–6 inches. The filter plates were cleaned

by scrubbing, soaking in hydrochloric acid (sp.gr. 1.14) and finally washing with hot water applied through a nozzle under pressure. The method employed for testing the loss-of-head through the plates before replacing them is outlined.

Experiments have been carried out on dewatering the sludge with an American Continuous Filter. The primary sludge, which contains 6 per cent dry solids when treated with 10 lbs. of alum per 1,000 gals., filters readily to 71 per cent moisture. A few determinations have indicated an erratic solid content in the activated sludge varying from 0.25 to 1.5 per cent. A mixture of 75 per cent activated and 25 per cent primary sludge treated with 5 lbs. alum per 1,000 gals. gave a cake with 75 per cent moisture or a little higher. A few tests with ferric chloride also gave good results, but the moisture content of the cake was somewhat higher. The mixture of sludges filters more rapidly than the primary sludge alone. It is not expected that the plant will be able to treat successfully the wastes during the approaching peak killing season.—Frederick G. Nelson, *Canad. Eng.*, 53, 25: 627 (Dec.), 1927. Abstr. R. E. Thompson.

Industrial Waste Research Problem in Southern California—Southern California has about 5,000 industries, many of which have serious difficulties in disposing of liquid wastes. No streams are available for dilution, and inland towns will be dependent on high grade treatment with disposal on land or in dry stream beds.

Research in industrial wastes is a logical extension of research in sewage disposal. Factors of temperature, staleness of sewage reaching plants due to low grades or long travel, and variable quality of sewage constituents due to high fruit and vegetable diets, all tend to make the problem of sewage disposal different from that in the East. The industrial wastes are also different, and separate study must be made of each kind of waste.

The only practical solution of the problem seems to be to have a research organization either as a part of the Department of Public Health, the Department of Natural Resources, or some other state department. Private engineers cannot afford to carry on this kind of research; industries will not carry it on unless forced to do so; salesmen can only try out their equipment, which is not likely to bring about fundamental solutions; student theses are not sufficiently prolonged to allow a complete solution; and the various organizations now working intermittently are not equipped adequately to handle the work.—R. F. Goudey, *Western Construction News*, 3, 1: 18 (Jan.), 1928. Abstr. E. A. Reinke.

Relation of Turbidity to Coagulant Dosage—In this paper is described the relation of the turbidity to the coagulant dosage as observed at the Omaha, Neb., filtration plant. From a series of tests by permitting river water to settle in a 5½-ft. glass cylinder for various lengths of time and then siphoning off samples for turbidity tests, it was found that the coagulants required could be determined by the results of the 3-hour settling tests.

During periods of high turbidity (10,000 p.p.m.) the application of coagulants at two points has been extremely helpful in delivering a satisfactory water to the filters. The effect of various turbidities on the coagulants required, also the results of the settling tests, are given in detail and shown on various charts of operation for June and July, 1926, and May, 1927.

The following conclusions are given: (1) The suspended material is chiefly responsible for variation in coagulant dosage; (2) coagulant dosage can be determined largely by the results of the 3-

hour turbidity test; (3) two-point application of chemicals is helpful in treating very turbid water; (4) the 24-hour turbidity test gives a good indication of the concentration of finely divided material, some of which is of colloidal nature.—Kenneth C. Armstrong, *Am. City*, 38, 2: 100 (Feb.), 1928. Abstr. J. B. Harrington.

Water Pollution Control, Milk Products Wastes—This bulletin presents a compilation of several important findings on the treatment and purification of milk products wastes. Investigations conducted in Massachusetts, Wisconsin, New Jersey, New York, Ohio, Iowa, and by the U. S. Public Health Service are noted with a brief discussion of the results found.

The experiments conducted at the Michigan State College in coöperation with the health department are discussed in more detail. Preliminary laboratory experiments indicate that in using the chemical precipitation method a good floc is secured and efficient settling occurs when sufficient quantities of ferrous sulphate and caustic soda are used. At least 0.6 p.p.m. of ferrous sulphate must be used or the precipitate will be red in color. Lime or caustic soda in quantities sufficient to produce a pH of 7.5 to 8.0 will give a good floc with good settling, but produces a large amount of sludge. Broad irrigation of milk products wastes is recommended as a temporary expedient where possible.—E. F. Eldridge, J. M. Hepler and H. S. Murphy, Department of Health and Department of Conservation, Michigan, June, 1927. Pamphlet 15 pp. Abstr. D. W. Evans.

Digestion of Vegetable Wastes and Screenings in Sewage Treatment Plants—Comprehensive researches in the digestion of mixtures of garbage, screenings, fresh sewage solids and digested sludge were made to ascertain whether garbage could be digested with the sludge at sewage disposal plants. Studies in the digestion of vegetable wastes from canneries will be made in the future. It was found that mixtures of vegetable wastes and fresh sewage solids digested very slowly; that the addition of ripe sludge greatly hastened digestion; and that lime dosing still further hastened digestion. The rate of digestion of vegetable wastes and screenings is slow due to production of acids, which inhibit growth of putrefactive organisms. The addition of lime neutralizes acidity; the addition of ripe sludge seeds the mixture; and the addition of fresh sewage solids provides the nitrogenous wastes necessary for normal digestion. It was concluded that vegetable wastes and screenings may be digested in sewage tanks provided the sludge capacity is adequate and provided the ratio of sewage solids to vegetable wastes (nitrogen to carbon) is large. The allowable ratios in practice will be determined by further studies.—W. Rudolfs and H. Heukelekian, *Water Works*, 67, 3: 113 (Mar.), 1928. Abstr. C. R. Cox.

Seeding New Tanks—The difficulty sometimes experienced in starting the operation of a new tank was deemed of sufficient importance to warrant laboratory experiments in order to determine what could be substituted for ripe sludge when the latter was not available. Definite quantities of fresh solids were mixed with ripe sludge, horse manure, cow manure and muck from a creek and results compared with fresh solids seeded with ripe Imhoff sludge. It was found that neither manure nor muck is so effective for seeding as ripe sludge. Muck was about half as good as ripe sludge and horse and cow manure still less. If sludge from a polluted stream is available for seeding it is to be favored. Seeding with horse manure and additions of lime are beneficial but

still inferior to seeding with ripe sludge. Addition of lime to fresh solids when ripe sludge is present for seeding keeps floating solids down.—William Rudolfs, *Report of the Department of Sewage Disposal of the N. J. Agriculture Experiment Station for year ending June 30, 1927*, pp. 284–94. Abstr. W. L. Havens.

Milk Supply—In the May issue of this JOURNAL there appeared the Report of the Committee on Milk Supply as presented to the Public Health Engineering Section at the last Annual Meeting.

The first part of the report relates to the standardization of equipment of rooms in which milk is handled. This leads into the methods of cleaning and handling apparatus; the definition of pasteurization with methods for operating pasteurizers, and several other questions.

The clear-cut style in which the report is prepared makes it easily understood. The complete report is worthy of study by all sanitarians.

Tadpole of the Spadefoot Toad an Enemy of Mosquito Larvae—Tadpoles of most toads and frogs are herbivorous and live in entire harmony with mosquito larvae. The tadpole of the spadefoot toad seems to be "departing from the traditions of its ancestors and relatives and adjusting itself to a new type of diet." The larger tadpoles of the spadefoot seem to live on a strictly carnivorous diet, the structure of the mouth being adapted for seizing and holding the prey, and are active and efficient enemies of mosquito larvae, as proved by certain laboratory and field experiments recorded in the article.

The toad has the advantage over fish in being able to travel overland to new habitats after the fish have been killed by previous drying-up of the water.

The season of the spadefoot toad is usually short and limited to early summer. This is a marked disadvantage as an enemy of anopheles, as well as other mosquito larvae. Its range is western and it is to be proved whether it might be possible and worth while to colonize it in other regions.

On the whole, no such antilarval efficiency can be expected of this tadpole as is exhibited by certain larvivorous fish; but its propagation, if such is practicable, could not interfere with any other enemy of mosquito larvae, and the more abundant and the greater the variety of natural enemies of mosquito larvae the better. The spadefoot would probably find its greatest usefulness in localities where there is extensive breeding of mosquitoes in shallow, temporary waters.—

M. A. Barber and C. H. King, *Pub. Health Rep., Reprint No. 1200*, Dec., 1927. Abstr. C. H. Kibbey.

INDUSTRIAL HYGIENE

EMERY R. HAYHURST, M. D., AND LEONARD GREENBURG, PH. D.

Intoxication with Commercial Methyl Chloride—The introduction of household refrigeration machines in which methyl chloride is used as a refrigerant has served to bring about a number of cases of poisoning with this substance in manufacturing plants engaged in making these refrigerants. Dr. Baker found that the gas is absorbed in amounts sufficient to produce intoxication unless precautions are exercised against this. The symptoms range from vertigo, staggering gait, sleepiness to nausea, anorexia and loss of weight. The detection of methyl chloride in the urine as ammonium formate prior to the development of symptoms of intoxication is suggested as a possible method for the control of the industrial disease.—H. N. Baker, *J. A. M. A.*, 88, 15: 1137 (Apr. 9), 1927. L. G.

Trend of Disabling Sickness among Employes of a Public Utility—The morbidity statistics of a large public utility situated in Massachusetts covering the period 1917–1927 were analyzed, with respect to the cause of disability, under five main groupings: industrial accidents, nonindustrial accidents, diseases of the respiratory system, diseases of the digestive system, and all other diseases.

The most important findings which these studies disclosed were the following: Disabling industrial accidents among the male employes showed a downward trend; on the other hand, diseases of the respiratory and of the digestive systems, which together caused nearly 70 per cent of the disability, exhibited a stationary trend. The author points out that the experience of this group should not be considered as typical or representative of the whole of the industrial population of the country, since the sample is rather small. The data, nevertheless, are of much value in casting light on the problem of sickness in industry.

The author further points out that in order to be productive of results preventive measures will have to be exceedingly definite in their application. In his opinion money and effort will be wasted if spent "on general principles." The common cold and indigestion as causes of industrial absenteeism are of paramount importance.—Dean K. Brundage, *Pub. Health Rep.*, 43, 30: 1957–1984 (July 27), 1928. L. G.

Benzol Poisoning as a Possible Hazard in Chemical Laboratories—The writer of this paper calls attention to the fact that benzol is often used in chemical laboratories in the making of certain tests and in the cleaning of glassware. Studies made in certain laboratories where benzol was used for these purposes indicated that while a lowering of the number of white blood cells (generally used as one of the indications of benzol poisoning) was not in evidence, the change in the percentage composition of various white blood cells was apparent on examination of the exposed persons. For this reason the author calls attention to the fact that benzol may constitute a real hazard in chemical laboratories.

The amount of benzol used in the average chemical laboratory for the purposes mentioned is so small that a more expensive solvent might be substituted without any real increase in upkeep of the laboratory. It should be possible to substitute some less toxic solvent, such

as toluol, xylol, or naphtha, such as recommended by the National Safety Council in its studies made on benzol poisoning.

In conclusion, it is recommended that all laboratory workers exposed to benzol fumes be given a thorough medical examination every month or two.—J. J. Bloomfield, *Pub. Health Rep.*, 43, 29: 1895–1897 (July 20), 1928. L. G.

Skin Eruptions in Industry—Dr. Mayers is of the opinion that there are few substances, no matter how innocuous to the average individual, which could not cause severe dermatitis in persons having a particular idiosyncrasy to them, citing the case of poisoning of a worker who was engaged in a factory wherein scented face powder was manufactured. The face powder apparently was used by thousands of consumers in the United States without ill effect, and yet this worker, apparently sensitive to some of the flower extracts in the powder, fell ill with a severe dermatitis.

In conclusion, Dr. Mayers points out that cases of dermatitis are at the present time regarded as occupational diseases and are covered by the law of the State of New York relating to these diseases.—May R. Mayers, *Indust. Hyg. Bull.*, V, 2: 5 (Aug.), 1928. L. G.

Atmospheric Smoke Pollution and Its Relation to Public Health—Many of us today are inclined to believe that the smoke problem was the product of intensive urbanization of the last few years. Such, however, is not the case. In this interesting contribution, Mr. Bloomfield points out that early in the 14th century a royal proclamation was issued in England prohibiting the use of sea coal in the furnaces of metal workers, and it is even recorded that one man who disobeyed the King's edict was executed in London for this crime.

Smoke has two effects upon health, the direct effect produced by the inhalation of this material into the lungs of the exposed persons, and the indirect effect, namely, the obliteration of sunshine and its health-giving rays. The author points out that city air is polluted by soot from burning coal, by gases, and lastly by dust from the ordinary occupations taking place in the city. The two most important gases present in city atmosphere are carbon monoxide and sulphur dioxide, and it is fair to say that under ordinary circumstances both of these are present in such small concentrations that they may be considered harmless so far as the average city dweller is concerned.

The present paper contains one of the most rational discussions on the effect of soot on the health of city dwellers with which the reviewer is familiar. To one versed in the methods of scientific inquiry it must be apparent that the proof of a question of this type is exceedingly difficult. Mr. Bloomfield's paper shows that the data and statistics so far brought forward do not permit one to arrive at a definite conclusion on this point. There is no doubt that soot is annoying, discomforting, and unesthetic, but the proof that it is actually harmful still remains to be forthcoming.

The indirect effects of smoke are really of enormous importance, but here, once again, the proof is wanting, and for the time being, while we all are cognizant of the fact that smoke shuts off a certain proportion of sunshine and ultra-violet light, it still remains to be proved that this effect is sufficient to be called injurious to health.

The solution of the problem of smoke pollution depends on the coöperation of the mechanical engineer, the fuel engineer, and the public, according to this paper.—J. J. Bloomfield, *J. Outdoor Life*, XXV, 8: 457–462 (Aug.), 1928. L. G.

FOODS, DRUGS AND NUTRITION

WALTER S. FRISBIE

The Septic Sore Throat Outbreak at Lee, Mass.—The epidemic of septic sore throat at Lee, Mass., which resulted in 600 cases with 36 deaths, has been officially traced to infected raw milk. Cultures of hemolytic streptococci were obtained from one of the cows and from a number of milk handlers. The first case was reported July 1 and terminated after the enforcement of a local ordinance of July 7 requiring all milk to be pasteurized. Dr. Bigelow, Health Commissioner of Massachusetts, feels certain that, as a result, the milk supply of the Berkshires is adequately supervised, and points to the moral that " raw milk is a very potent vehicle for the transmission of disease."—*Pub. Health Rep.*, 43: 2112 (Aug. 10), 1928.

La Cuisson sous Pression des Aliments (Cooking Food under Pressure)—In order to determine whether a short pressure cooking of 120° C. would be equivalent to a cooking for several hours at 100° C. in ordinary vessels, this experiment was undertaken: Two vessels exactly alike were employed, one using the ordinary method, and the other in a commercial pressure autoclave. Analyses of the products of the resultant cooks were made, paying particular attention to the distribution of nitrogen, since this permits a method of determining the degree of proteolysis. This comparative experiment was conducted with soup composed of meat, bone, vegetables and the usual condiments. Analytical figures are submitted showing the content of the material prepared by both methods—dry extract, nitrogenous material, fat material, reducible and saccharin matters, other carbohydrates, and fixed minerals. Analytical data are also submitted of the meat, both in the fresh state and after cooking, including determination of the total soluble nitrogen, residual nitrogen, alpha amino nitrogen, and ammoniacal nitrogen. These figures indicate: (1) that the degree of proteolysis of fresh meat is relatively increased; (2) in the soup cooked in the autoclave as well as that prepared by ordinary methods the ammoniacal nitrogen contained in comparison with the total soluble nitrogen is less than in the fresh meat.

The results respectively reported for the two methods show that the soluble nitrogen prepared by autoclave is richer in amino acids than that obtained by ordinary cooking and that it contains a quantity of ammoniacal nitrogen greater than that provided in the meat. The transformation of amino nitrogen into ammoniacal nitrogen takes place in artificial hydrolysis as well as in the natural proteolytic decomposition. It appears to take place in proportion to the increase in splitting of nitrogenous material, and under certain conditions with a rapidity equal to that in the decomposition of proteins into amino acids. From a nutritional viewpoint the production of ammonia has little importance, for even if it has not been shown up to the present that the element is harmful, it is of no particular value to the system.

In conclusion, since soup prepared in the pressure cooker contains less nitrogenous material, fat, reducible matters and dry extract than the ordinary soup, it might be said that it is less nutritive than the latter. On the contrary, the meat is better when cooked under pressure. It is contended that the pro-

cedure has advantages and some disadvantages which approximately equalize. From the economic standpoint the pressure cooker is preferable since it consumes less than one-quarter the amount of gas of ordinary cooking.—M. J. Froidevaus, *Annales des Falsif.*, 234: 252 (June), 1928.

The **Effect of Large Amounts of Pineapple Juice**—Recent arrivals in the Hawaiian Islands complain of discomfort after the ingestion of large amounts of fresh pineapple, which is relieved by discontinuing the pineapple and administering sodium bicarbonate. Since pineapple is regarded as potentially alkaline, a d in the belief that it would not cause acidosis, four healthy women were the subject of a digestion experiment to determine the effect of this juice on the urine. After a short time on a basal diet consisting of milk, crackers, egg, apple, and butter, 1 quart of pineapple juice was added for two consecutive days, and on the third day 1½ quarts in one subject and 1¼ quarts in another. In a subsequent experiment the basal diet was supplemented by the addition of white potato. Results reported on the urine include, total volume, pH value, titratable acidity with N/10 NaOH, and ammonia. These show that large amounts of fresh pineapple juice result in lower acidity both as indicated by the pH value and by titration and a decrease in ammonia output. These results would be expected according to the report that citric acid constitutes 87 per cent of the nonvolatile acid in pineapple juice. The explanation of the apparent acidosis is attributed to the presence of calcium oxalate crystals in the juice. The fact that cooked pineapple is less irritating was explained by the activity of the crystals and the fact that the proteolytic enzyme, bromelin, is destroyed in canning.—Carey D. Miller, *J. Home Econ.*, 20: 498 (July), 1928.

Effect of Pasteurization on the Bovine Tubercle Bacillus in Naturally Infected Tuberculous Milk—In conducting the experiments reported in this article the author used naturally infected milk from three tubercular cows in order to overcome certain objections to the use of milk inoculated with cultures of tubercle bacilli, namely, that artificial cultivation yields organisms which are less resistant to outside influences than those occurring naturally, and that cultures of bacilli can have no such protective covering as is provided by cells and tissue in natural infection. Four series of experiments were conducted in which the milk was heated at (1) 62.8° C. (145° F.) for 30 minutes, (2) 60° C. (140° F.) for 30 minutes, (3) 60° C. (140° F.) for 20 minutes, and (4) 59.3° C. (138.8° F.) for 20 minutes. Guinea pigs were inoculated with the centrifugalized deposit and the ream of the heated milk, as well as with coagulated material from the cooler. In the first series 1 guinea pig, out of 118 inoculated, developed tuberculosis. In the second series, out of 100 guinea pigs inoculated, none developed tuberculosis. In the third series 1 guinea pig, out of 66 inoculated, died of tuberculosis. In the fourth series, 10 out of 12 inoculated guinea pigs developed tuberculosis. In each of the first and third series 1 guinea pig died from tuberculosis following inoculation with coagulated material from the cooler. In the third series both positive cases occurred near the end of the lactation period when the milk was abnormal.

It is pointed out that standardized thermometers must be used in commercial pasteurization but that with all precaution it is by no means always possible to exercise the strict control which obtains in the laboratory. The author concludes that temperature of 62.8° C. (145° F.) for 30 minutes does not invariably kill the tubercle bacillus in naturally infected milk, although in

most cases this temperature is effective, and that at a temperature of 60° C. (140° F.) for 20 minutes tubercle bacilli are in many cases destroyed; but this combination of time and temperature leaves no margin of safety.—L. J. Meanwell, *Brit. J. Hyg.*, 26: 392 (Oct.), 1927.

Biological Values of Certain Types of Sea Foods. III—Vitamins in Clams—The work reported was conducted similarly to experiments on oysters which were shown to be a good source of vitamins A, B, and D, but deficient in E (see abstract, this JOURNAL, Mar., 1928, p. 374). Two commercial varieties of clams were used, *Mya arenaria* or "soft-shell clam" and the *Venus mercenaria* or "quahaugs," the former obtained from the Maine coast and the latter from the lower Potomac River. Raw, frozen, hard-shell clams, fed to 50-gm. rats in 2-gm. and 5-gm. daily doses, resulted in all cases in a decline in weight, polyneuritis and death. Similar results followed the ingestion of frozen, cooked quahaugs and desiccated quahaugs. Prophylactic tests using soft-shell clams in the 5-gm. level also indicated evidence of appreciable amounts of vitamin B, which in this work refers to the vitamin B complex without reference to its separate factors.

In attempting to cure experimental xerophthalmia, quahaugs were fed at 4 levels, 1, 2, 3.5 and 5 gm. Five gm. cured xerophthalmia completely but did not prevent slight reoccurrences. With the soft-shell clams, daily doses of 3.5 gm. rapidly improved the xerophthalmic rats, the 5-gm. level being adequate for a cure and indicating some superiority in vitamin A in the soft-shell clam over the hard-shell clam. Vitamin D was determined by the line test method. Five gm. of hard-shell clams resulted in 10 days in half calcification and in 15 days in almost complete calcification of the rachitic metaphases. Similar results were obtained with the soft-shell clams, which compared with the oysters indicated clams to be superior as a source of vitamin D. As a confirmation, the ash of clams was fed in doses equivalent to 5 gm. fresh clams and the calcifying effect in 10, 15 and 20 days was practically negligible, warranting the conclusion that the antirachitic activity is due to vitamin D and not to superimposed phosphorus. Dried, cooked hard-shell clam meats were fed as a meal to determine the reproduction and lactation factors. This experiment was conducted through two generations, in both of which the rate of growth was satisfactory. Better results were obtained in the second generation rats, in which 82 per cent of the young were reared, as against 61 per cent in the first generation. On the same basal diet with oysters only 14 per cent of the young were reared and in the second generation none was reared, warranting the conclusion that clams are superior to oysters in the reproduction and lactation factors.—D. Breese Jones, E. M. Nelson and J. C. Murphy, *Indust. & Eng. Chem.*, 20: 648 (June), 1928.

The Possibility of Producing Iodized Milk—Although figures for the iodine content of milk are given by various investigators, Forbes and others at the Ohio Experiment Station do not find iodine in milk of cows fed at the station. Milk from cows on a variety of rations and at different stages of lactation has been analyzed. In order to determine if the feeding of iodine to cows would increase the iodine content of the milk, certain cows were given potassium iodide fed in minimum amounts in order to avoid possible deleterious effects. Four cows for one complete lactation period received 0.1 gm. daily of potassium iodide equivalent to 0.08 gm. (1.2 gr.) of iodine. Six other cows received potassium iodide for varying lengths of

time. Iodine was found in the milk of these cows in amounts from 1 part in 100 million to 1 part in 10 million. This is only a very small part of the iodine fed, indicating that there is some mechanism influencing the secretion in the milk. Tests were made on 6 cows in a commercial herd near Columbus, 2 receiving no iodine, 2 receiving 2 oz. of dulce, one receiving 2 gr. of calcium iodide and the other 2 gr. of potassium iodide per day. No iodine was found in the milk before experimental feeding. After feeding for 30 days, milk from the check cows showed no iodine while milk from 4 other cows showed iodine from 1 part in 10 million to 1 part in 100 million. The iodized milk as the result of iodine fed is not richer in iodine than milk produced in sections where feeds are naturally rich in this element. Milk with an extremely low iodine content is regarded as being equally abnormal as one with a high iodine content.—C. P. Monroe, *Ohio Agri. Exp. Station Bulletin,* 13: 153 (July–Aug.), 1928.

The Relative Stability of Vitamin A from Plant Sources—Recent reports of the stability of vitamin A in butterfat and cod liver oil have prompted this investigation as to the comparative stability of this vitamin from vegetable sources. The foods to be tested were given to 28-day-old rats which had been reduced to vitamin A depletion by a special diet. Canned tomato juice filtered through cheese cloth was freed from oxygen by the introduction of nitrogen gas, and it was found that 7 c.c. of this juice after heating 4 hours in a flask at 97° ± 2° were required to produce the same gain in weight as 5.8 c.c. unheated juice in daily doses. When the juice was heated to the same temperature in the presence of oxygen 7 c.c. was found to be equivalent to 5.8 c.c. unheated juice. Both tests were conducted with tomato juice of normal acidity pH about 4.82. The effect of heated tomato juice in an alkaline medium was undertaken, the filtered juice being brought to a pH of 9.2 with NaOH and heated 4 hours at 98° ± 2° in the presence of nitrogen. After reducing the heated juice with hydrochloric acid to the normal acidity, pH 4.2, this was fed in 2 c.c. doses daily.

After 8 weeks the average weight gained was 47 gm. for a juice heated at pH 4.2 and 45 gm. for the alkalinized heated juice, indicating practically no destruction of vitamin A. In comparing the animal and plant sources of this vitamin, dried spinach leaves and butterfat in olive oil solution were respectively heated 4 hours at 97° ± 2° under anaerobic conditions. About 20 per cent of the vitamin A in spinach and about 33 per cent in butter were destroyed in this heating, indicating vitamin A from this vegetable source to be more stable than that in butter.—H. C. Sherman, E. J. Quinn, P. L. Day, and E. H. Miller, *J. Biol. Chem.,* 78: 293 (July), 1928.

CHILD HYGIENE

MERRILL E. CHAMPION, M. D.

The Prevention of Maternal Mortality—The problem of maternal mortality is one which is attracting the attention of the laity as well as of the medical and nursing professions. It apparently has always been of especial interest to women members of the Labor Party in various countries. As might perhaps be expected, more stress is laid by the laity on "maternity benefits" in the shape of financial and other aid than would be the case with those trained in the science of "public welfare."

In England recently the Standing Joint Committee of Industrial Women's Organizations prepared a report for the National Conference of Labour Women. The recommendations of this committee ought to be of interest to public health and social workers in any country. American readers should, however, bear in mind the English background of Insurance Act and "doles" in any criticism offered of some of the committee's suggestions set forth below:

1. It should be compulsory for every health authority to prepare within a given time, say one year, a complete scheme for maternity work. . . .

2. Such a scheme should include the following:

(a) Sufficient ante-natal clinics to enable all pregnant women to seek advice. . . . We think that these clinics should all be organized and controlled directly by public health authorities, instead of some being under voluntary agencies. . . .

(b) Sufficient maternity beds . . . for all women whose confinements are likely to be difficult or whose home circumstances make confinement at home unsuitable and dangerous. Such provision should not be associated with the Poor Law, and should be free where necessary, with a rising scale of reasonable charges based on income. . . .

(c) National health insurance. We are in favour of the extension of medical benefit to the wives of all insured persons and the administration of that benefit by the local health authority. This should include medical attendance and nursing care in pregnancy and childbirth free of all additional charge. . . .

(d) Sickness benefit.

(e) Maternity benefit.

(f) The provision of home helps to assist the mother in her housework both before the child's birth and in the period following is essential.

(g) Provision of food. It should be the business of the local authority, on application from its health visitors, clinics, and the doctors and midwives, to make provision for food for mothers in need of it free of cost, and at cost price for those desiring to pay.

(h) There is need for a great reorganization of medical, midwifery, and nursing services.

(i) The Medical Service must work in closest coöperation with the ante-natal clinics and maternity homes and hospitals.

(j) Where the patients are not themselves able to provide the necessary sterilized outfits, these should be provided for the use of doctors or midwives free of cost.

3. We think that there should be an inquiry into every death from puerperal causes.—

The Prevention of Maternal Mortality, *Med. Off.*, 14 (Apr.), 1928.

Child Guidance Clinics—"Child guidance clinics do not include all child guidance work; child guidance is the responsibility of a whole community, not of just one agency." With this sound statement, Stevenson begins his discussion of the problem a community faces in deciding whether or not it ought to have such a clinic.

The first step, the author feels, is to restrict and define the meaning of the term "Child guidance clinic." He would keep it for a clinic "that uses a combination of psychiatric, psychological, and social work technics as applied to the diagnosis and treatment of the

behavior problems of children, for the most part of normal intelligence." Such a clinic has to do with all the children of the community, not merely the dependent ones. Unless the community feels this, it is not ready for a child guidance clinic. Again, the community must not look to such a clinic to "take the troublesome children off its hands." It cannot be done if for no other reason than that of numbers.

"The big job of the clinic," according to Stevenson, "is the education of a community in matters of mental health and the mobilization of its resources to this end." Furthermore, the clinic works largely through other professional groups rather than through parents and children.

A community is not ready for a child guidance clinic until: (a) it has a small intelligent group interested in child guidance work who will educate a still larger group; (b) well-developed social work is available; (c) there are good court facilities for handling the social problems of child and adult.

Finally, suggestions are offered communities unable to have a child guidance *clinic* whereby they may carry out child guidance *activities*. The points enumerated are: trained psychiatric social work; special instruction and classification in the school system under an educational psychologist; provision for local diagnosis and care for the feebleminded; vocational training classes in the public schools; coördination of school and preschool general medical clinics.—George S. Stevenson, M.D., When Is a Community Ready for a Child-Guidance Clinic?—*Mental Hyg.*, July, 1928.

Prenatal Care vs. No Prenatal Care—The study under review was made at the prenatal clinic of the Louisville City Hospital, associated with the obstetrical department of the University of Louisville Medical School, and covered all cases treated in the obstetrical department of the hospital for a given length of time. All deaths, maternal and fetal, were included, whether from obstetrical causes or not, on the theory that prenatal care is expected "to protect mothers and babies from all danger, medical, surgical or obstetrical, which may arise during the prenatal period."

A general physical examination was given all patients, which included pelvic measurements, blood pressure reading, urinalysis and Wassermann test. Patients came to the clinic at intervals of two weeks for the first seven months, and one week during the last two months of pregnancy.

In recording the deaths, there were included patients practically moribund on admission. Neonatal deaths, that is, those occurring during the first two weeks of life, were also charged up to the obstetrical department in this study.

The results were as follows: There were 3,217 mothers delivered during a period of something over 4 years. Of these, 2,061 had one or more prenatal visits. The rest—1,156—had received no prenatal care. That is, about two-thirds had and one-third had not prenatal care. The maternal death rate among the prenatal clinic cases was 2.91 per 1,000 deliveries as compared with a rate of 22.4 among mothers not getting prenatal care. As regards fetal deaths, the rate was 7.5 per cent among clinic patients as compared with 22.6 per cent among non-clinic patients.

One other point is of great interest. With respect to "eclampsia," the record was 0.58 per cent cases and no deaths among those attending the prenatal clinic; and 3.02 per cent cases and 8.6 deaths per 1,000 deliveries among the non-clinic patients.—Alice N. Pickett, M.D., A Study of the Results of Prenatal Care vs. No Prenatal Care. Read before Kentucky State Medical Association, Oct., 1927 (Reprint).

PUBLIC HEALTH NURSING

MIRIAM AMES, R. N.

Keep This in Mind—Public health nurses attending the Annual Meeting of the American Public Health Association in Chicago, October 15 to 19, will have the privilege of studying at close range the methods used in conducting a nursery school. The Franklin Nursery School, which is established and maintained by the Elizabeth McCormick Memorial Fund in coöperation with the Institute for Juvenile Research, will serve as a model.

Visits to Infant Welfare Stations and the various centers of the Chicago Visiting Nurse Association will also be included in the nurses' program.

Breaking Faith with the Indian—"Breaking Faith with the Indian," an article in *The New Republic*, calls attention to the conditions in the reservations which cry out for improved public health service, reading in part:

> Indian education as a whole can only be called a failure.
>
> Indian health is much inferior to that of the whites. The general and infant mortality rates are both very high, though statistics are kept so badly that it is impossible to say just how high they are.
>
> The Indians live under conditions of great overcrowding, with inadequate ventilation and sanitation. It is not even possible to segregate those suffering from communicable diseases.
>
> Many of the Indians live on land so poor that it is hopeless to expect them to make a living from their efforts as farmers, even if the government properly assisted them to do this, which it does not. . . .
>
> The whole Indian service suffers because of the fact that salaries of administrators are too low. It is impossible to get good men more than temporarily for the remuneration offered. This is particularly true of the doctors, nurses and teachers. These low standards may account for the fact that in the treatment of trachoma, for example, no attention is usually paid to modern discoveries as to the relation of the disease to insufficient diet, but recourse is had to a radical operation. This operation has been performed in many cases when it was unnecessary, including some in which the patient did not have trachoma at all. In one special school for children suffering with trachoma, the normal diet actually includes no milk. Everywhere, there is an insufficiency of milk and of fresh vegetables. . . .
>
> New positions in the field of health, economic advancement, education and social development should be created, and salaries fixed which are high enough to attract competent persons. Public health clinics for the Indians are urgently necessary, particularly in the struggle against the two most prevalent diseases, trachoma and tuberculosis. D. D.

The Interrelations of the Hospital Social Service Departments and the Community Health Association of Boston—One of the fundamental premises of health or social workers in any field is that health, economic security, harmonious relationships with the family and society, balanced living, all are interdependent and indispensable factors in the full free life of the individuals for whom their work exists. In order to consider all these factors in working for the welfare of their clients or patients, the special workers in any one field of social work must and do use the services of other groups. Most particularly do hospital social workers and visiting nurses depend upon each other.

However, in the pressure of work and the intensity with which each group has been developing and changing during the past twenty years, there has been little time for directed effort toward knowing each other's functions or considering the best methods of working together.

With the view of securing a better

working partnership between the hospital social workers and the visiting nurses of the Community Health Association of Boston, a study of their relationship has been made during the first part of this year. The survey was made by Mrs. Hilbert Day, with the assistance of a committee made up of representatives of the two groups. The final report of this survey has recently been printed, and its findings and recommendations are probably sufficiently applicable to other communities so that it may be of interest to readers of this JOURNAL.

The study was conducted by means of interviews, letters and case studies, gathered together over a period of about three months. On the whole, both interviews and case studies have resulted in repeated affirmations of good cooperation between the two groups, and tolerance toward some of the inevitable difficulties. In about 15 per cent, or 168 of the 1,000 case studies, relationships were considered by the nurses to be unsatisfactory for one reason or another, and the social workers made a few general criticisms of the nurses' methods of work. Since each unsatisfactory case represents inefficient service to the family, and is a potential cause of ill feeling which reacts upon future relationships, and since there is every indication that the interdependence of the two groups is to become more important as time goes on, it seemed to the committee wise to try to analyze and, if possible, suggest corrections for the underlying difficulties in these 168 cases.

The causes for unsatisfactory coöperation fell into a few definite groups:

1. Conditions which cannot at present be altered, but which by recognition and understanding can be greatly minimized:
   - A. Insufficient number of hospital social workers
   - B. Unavoidable turnover of nurses on a case
2. Mechanical details which can probably be remedied:
   - A. Variations in methods of referring cases, and inadequate information given about cases
   - B. Lack of uniformity as to what cases shall be accepted as social cases by hospital social workers
   - C. Undetermined policy as to responsibility for social follow-up in individual cases
   - D. Difference between the two groups in the "time standard" for action on a case
   - E. Lack of routine methods in Social Service Departments for securing medical information and orders for the use of the nurses
   - F. Poor administration of certain accepted routine procedures
3. Elements not fully perceived or used:
   - A. The Community Health Association nurses have an intimate and useful fund of knowledge of family conditions of many patients, due to many illnesses or long contact with the families
   - B. Opportunity for further use of the Community Health Association for group services to patients, as is already done in classes for prenatal patients
   - C. Complementary nature of the professional education of the two professional groups, if rightly utilized

Since the fundamental strength of the relationship of the two organized groups is dependent upon understanding, it is recommended that:

- A. A continued process of education be considered by:
  1. The addition to the training of students in the School for Social Work and the School of Public Health Nursing of a short period of observation in the work of the other group
  2. An exchange of workers between the two groups for short periods of observation
- B. The conference method be used for discussion of problems mentioned above
- C. Case conferences be held to discuss such difficult cases as involve the intensive work of both groups
- D. A social case worker be considered as a consultant on the staff of the Community Health Association.

K. E. P.

EDUCATION AND PUBLICITY

EVART G. ROUTZAHN*

Help on Your Job at Chicago—The section meetings, the Education-Publicity Headquarters, the contacts with those concerned with public health education *should be of real, definite, practical help in doing more and better work*. And of course you have ideas and information of value to the other fellow.

Professional and Lay Coöperation—The coöperative promotion of the health examination idea by the Medical Society, County of New York, and the New York Tuberculosis and Health Association in a Joint Campaign is told in a reprint from *The Physical Examinist* of an article by Iago Galdston, M.D. Since the procedure and educational material are available through free copies of the reprint, it is sufficient here to urge every health worker interested in the subject to request a copy from the New York Tuberculosis and Health Association, 244 Madison Ave., New York, N. Y. (*See exhibit at Chicago.*) 3 cents postage.

"An Important and Worthy Object"—A leader in the field of psychiatry said:

> May I add to this statement a conviction that I have for many years maintained, namely, that in efforts to get over what we possess to these others that we should undertake the task not as a task that is beneath us but as one well worthy of our metal. The task of popularization, as it is generally called, is too often conceived to be unworthy of the scientific man, but as Professor Robinson has said, in substance, the getting over of the results of scientific inquiry to the public, or at least to that portion of it who can and who ought to know about them and use them, is as important and worthy an object of scientific research as the discovery of new scientific facts. In fact it is itself a problem in the realm of methodology and should be so considered. In the past I am sure we have erred very seriously by presenting our material in a way that activated the resistances of our audiences.—
>
> Dr. William A. White, *Psychoanalytic Rev.*, Apr., 1928. (Contributed by Paul Komora of National Committee for Mental Hygiene.)

At Every State Convention—At every state health convention and every state conference of social work there should be enough delegates interested in public health education to call a luncheon conference. One plan: ask each one present to state one question he would like to have answered. Then the group present will select the questions to be taken up at the luncheon. Appoint a small committee to plan another luncheon next year. Please write to Prof. John Sundwall, Lansing, Mich., to state that you will arrange for such a luncheon session this fall or winter.

Never Too Late to Learn—"The long and short of it is that modern psychology has demonstrated that for practical purposes age is only a minor handicap, if any at all, to learning anything you want to learn or need to learn." So says Albert Edward Wiggam in *Good Housekeeping* (Sept., 1928), in "It Is Never Too Late to Learn," a popular discussion of recent studies by Thorndike and others. Our job is twofold: first, to cultivate the *will to learn*, and second, to learn a lot more ourselves about how to teach health to adults.

* Please address questions, samples of printed matter, criticism of anything which appears herein, etc., to Evart G. Routzahn, 130 East 22d St., New York, N. Y.

Stimulating **Advertisements**—Numerous advertisements in magazines and elsewhere should suggest types of headings for folders and booklets, and ways of developing practical health education material leading away from the conventional practices of health workers. Examples: "I *just couldn't* afford to be laid up"; "Little adventurers! New, better ways to guide them"; "100 per cent of her pupils gained in weight!"; "So many things you do for them—which will count most in the years to come?" and "Beauty Wins—Beauty Keeps" in *Good Housekeeping*, Sept., 1928.

A Simple, **Popular Service**—Scales in the City Hall! Why not? Make an event of installing the scales by weighing the mayor and other officials. Then a week or two later extend a formal invitation to all citizens to use the scales, inviting several leading citizens to start the idea. Of course, you will let the newspapers know in advance so that photographs may be taken. Height and weight tables can be displayed near the scales.

EXHIBITS

"Classroom Display Settings," by E. A. Deuch, *Infants' and Children's Dept.*, 323 West Jackson Blvd., Chicago, Ill. Probably *free*. Illustrations and text offer ideas adaptable for window display of child health. The large blackboard in the background gives the health opportunity.

Publishers' Weekly tells of a large grandfather's clock in a book store window. "Although it was regularly wound up and kept time correctly, a sign above the clock informed passersby that 'This is not the right time.' Many people naturally stopped to make sure, and on looking more closely they found a smaller sign at the foot of the clock which read '—to be neglecting your education.'" Change the copy to read "—to be neglecting your health examination"—or what you will.

"The Retail Grocers' Association of Syracuse has voted to coöperate with the department of health in the grocery store exhibits for the current year. Its coöperation is to express itself: (1) by carrying the exhibits from one store to the next; and (2) by printing a leaflet to accompany each exhibit emphasizing health and nutrition lessons."—*Better Health*, Syracuse Dept. of Health.

A truck in a safety parade carried these legends: "The Chance Taken Is an Accident Maker"; "What Do I Care about Safety? Look Who I Am?" On the truck was a donkey!—*Public Safety*, 108 East Ohio St., Chicago, Ill., Apr., 1928. *Free.*

POPULAR ARTICLES

"Decay of the Teeth Is Found Preventable." *New York Times*, Apr. 1, 1928.

"Feet Made to Fit Shoes or Stockings." *Press Bull.*, University of Wisconsin, Madison, Wis., Aug. 29, 1928. *Free.*

"It's the Timidity," by Ruth F. Wadsworth, M.D. *Collier's Weekly*, July 28, 1928. "Most of the things we can do to attain at least the feeling of being cool most of us are convinced are bad for us." File this for next summer's use.

"Prolonging Life." Editorial, *Sat. Ev. Post*, June 16, 1928.

"Snake's Hips," by Brenda Ueland. *Collier's Weekly*, Mar. 17, 1928. Exercise for fat and lean women. High heels make fat legs.

ANNUAL REPORTS

The annual report of the State Charities Aid Association of New York, "Milestone 55," has 116 large book size pages, reporting in considerable detail on a wide range of activities. But the report largely avoids the appearance of being dull and heavy via good margins,

short paragraphs, sub-heads and type size. A table of contents (no index); arranged in "chapter" form; few statistical tables; extensive staff and committee lists and financial report *in the back pages*.

If you are studying annual reports ask the local associated charities to see copies of these reports: Hartford C.O.S. (how the cases are classified on page 3), Family Society of Philadelphia (for tabbed-in photographs; and general layout—though it lacks sub-headings); Cleveland A. C. (for picture map showing districts and activities; in copy and plan it is a gem, except type is too small).

Report of Maternity Center Association, 578 Madison Ave., New York, N. Y., illustrates striking use of color in diagram and map.

"Are You Satisfied with the Annual Reports You Receive?" by Marguerite A. Wales, *Public Health Nurse,* Apr., 1928. "The trend in content of reports during the past few years should hearten even the pessimist."

WORDS

"The Importance of Respiratory Diseases as a Cause of Disability among Industrial Workers(!)." A radio talk.

DIPHTHERIA

In a report of the June, 1927, meeting of the Tri-state Medical Conference, are interesting reviews of the participation of state and county medical societies in Pennsylvania, New York and New Jersey. *Atlantic M. J.,* Harrisburg, Aug., 1927. 35 cents.

Dr. D. S. Dooman, health officer and school physician of Garden City, N. Y., having found confusion in the minds of some parents to whom consent slips for toxin-antitoxin were sent, forwarded a questionnaire to the parents of every child in the Garden City schools. The questions covered whether the child had T. A. T. from the family physician or otherwise, and whether the parents were willing that the inoculations be given at the school. "Within 72 hours we had a record of every child."—The full questionnaire in *Health News,* State Dept. of Health, Albany, N. Y., Dec. 26, 1927. *Free.*

"The best birthday gift to your child is a certificate of protection against diphtheria. Your child should receive Diphtheria Toxin-Antitoxin before his first birthday."—*Sanitary Bull.,* Buffalo Dept. of Health.

Detailed account of Philadelphia's diphtheria campaign, with reproductions of educational publicity material. *Monthly Bull.,* Philadelphia Dept. of Health, July–Aug., 1928.

Application to diphtheria of preventive spraying against insects in a rural community in "Calhoun County Starts Fight on Diphtheria." *Ill. Health News,* State Dept. of Health, June, 1928.

Suggested Curtain-Raiser for the Organization of a Local Campaign. Mimeographed idea for organization meeting. State Committee on Tuberculosis and Public Health, 105 East 22d St., New York, N. Y. *Free.*

Diphtheria Prevention for Preschool Children—A Community Project. As above. *Free.* The New York plan of procedure.

Diphtheria—Its Prevention and Control. By U. S. Public Health Service. 20 pp. *Revised.* Supt. of Documents, Washington, D. C. 5 cents.

NEWS POSSIBILITIES

Check up on the "best sellers" in the health field at book stores, and the "best lenders" at the public library. If the leaders are of the right sort you have a minor newspaper story, and you may glean something as to health questions in which the public is interested. If the wrong books head the list you have data for consideration in planning your year's program.

LAW AND LEGISLATION

JAMES A. TOBEY, LL. B., DR. P. H.

Milk and the Courts—There are on record in this country about 175 decisions of courts of last resort on the subject of milk. In 1924 an endeavor was made for the first time to compile a complete list of these decisions, and 121 reported cases in 32 state and federal courts were assembled by the associate editor, and listed by states at the end of an article on the legal aspects of milk, which appeared in *Public Health Reports* for July 18, 1924. This was later issued by the U. S. Public Health Service as *Reprint No. 939*. Court decisions dealing with pasteurization requirements were discussed in *Public Health Reports* for July 1, 1927, and this article has been published as *Reprint No. 1168*. A paper summarizing court decisions on milk during the year 1927–1928 was read before the meeting of state health officers at St. Paul in June, 1928, and will be published later.

The most complete and useful enumeration of court decisions on all phases of control of milk appeared in *Public Health Reports* for August 10, 1928, in connection with an article on "Regulating the production, handling, and distribution of milk," by Harvey Walker, Acting Secretary of the League of Minnesota Municipalities. Mr. Walker's article consists of a restatement of the legal principles which apply to milk regulation. Appended to this is a comprehensive annotated list of about 150 court decisions, arranged according to topics, of which there are 32. Mr. Walker's list includes the court decisions on milk which have been reported since the earlier article appeared in 1924, as well as a considerable number of others not included there. On the other hand, the 1924 material cites about 25 decisions not given by Mr. Walker.

The references compiled by Mr. Walker are unusually complete. Not only is the date of each case given, but there are citations to all of the different law reporters in which each decision may be found. The assembling and arrangement of these court decisions is a notable contribution to public health law, one which will be of great value to sanitarians in administrative positions.

Law and the Conservation of Vision—School laws requiring vision tests to be made as part of the medical inspection program or as special tests have been a distinct factor in the effectiveness of work for the conservation of vision, according to the revised edition of a pamphlet entitled "Conserving the Sight of School Children," prepared under the direction of Dr. Thomas D. Wood for the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association. The provisions of the various laws differ greatly, however, and the report accordingly urges the preparation of a uniform model law for the examination of the eyes of school children, which might be adopted in all states. A copy of this valuable pamphlet may be obtained from the National Society for the Prevention of Blindness, New York, N. Y., or through the book service of the A. P. H. A.

Nearly one-half of a group of approximately 2,000 school children examined were found to need glasses, according to a news release issued by the U. S. Public Health Service under date

of September 4, 1928. These results of a typical group may be taken as representing conditions in the general school population of the country, according to the Service.

The adoption and enforcement of laws requiring physicians, midwives, and other attendants at birth to put prophylactic drops in the eyes of babies at birth has resulted in a decline of 64 per cent in the frequency of ophthalmia neonatorum as a cause of blindness among those admitted to schools for the blind, according to a recent news release from the National Society for the Prevention of Blindness.

Protective eyeglasses for industrial workers are described in a pamphlet issued in August by the U. S. Bureau of Standards, Washington, D. C., after, it is said, ten years of research.

Liability of City for Water-borne Typhoid—The courts recognize that the purity of water is of great importance to public health. As was pointed out in this department in the June issue, it now seems to be well-settled law in this country that a municipal corporation, while not an insurer of the purity of water supplied by it, may be, nevertheless, liable for negligence in furnishing water which causes disease. The city must exercise reasonable care to secure and maintain the purity of the water. This doctrine has recently been upheld by the Appellate Division of the Supreme Court of New York, and the July issue of the Indiana *Monthly Bulletin* contains the information that a Circuit Court in that state has recently awarded damages of $9,000 against the City of Fort Wayne and the Pennsylvania Railroad, because of a death from typhoid due to bad water from the railroad's industrial supply which got into the city water.

The New York case, Wiesner vs. City of Albany, 229 N. Y. S. 622, is of interest not merely because it sustains the legal principle, but also because of the holding with respect to the adequacy of the evidence needed to prove the injury. From a copy of this decision, which has been sent us by B. R. Rickards of the New York State Department of Health, it appears that a 7-year-old child contracted typhoid fever from the city water, which was taken from the highly polluted Hudson River. Tests of this water prior to the development of this case were made by an employe of the State Department of Health, who found colon bacilli, an evidence of human contamination.

Notice of this fact was sent to the city officials, who also knew of the presence of a defective conduit, and were aware of an unusual prevalence of gastrointestinal diseases in the city. "It was a time for prompt and decisive action," said the court in its opinion. "The exercise of vigilance would have led to discovery of the dangerous condition, and reasonable diligence would have provided the remedy."

These events occurred in April. In May there were 83 cases of typhoid of local origin. The plaintiff in this case offered proof pointing to the city water as the cause of the disease and excluding other sources. The city argued that there were other possible sources, but proved none. In its able opinion, the court said:

> To insist that the plaintiff must establish that the infection came from the city water by positive proof would be to require an impossibility. It is sufficient if it is shown by the best evidence available that the bacilli were introduced into his system by means of the city water, so that the jury may by reasonable inference reach a conclusion to that effect. This is not speculation, but a process of logical deduction (Forbes vs. City of Jamestown, 212 App. Div. 332, 335; s.c. 217 Id. 714). If the plaintiff is able to establish facts from which it can be said with reasonable certainty that the direct cause of the injury was the one for which the defendant was liable, a more stringent rule will not be applied to his case and the jury will be permitted to say that they are satisfied with the proof made, and to de-

Armine therefrom the source of infection was the polluted water (Stubbs vs. City of Rochester, 220 N. Y. 516, 526).

This case is also abstracted in *Public Health Reports* for August 10, 1928 (page 2114), the same issue containing the court decisions on milk control referred to above. A reprint on the legal liability for water-borne typhoid may be obtained from Wallace & Tiernan Company, Newark, N. J.

A Sanitary Engineering Section at Washington—Effective July 1, 1928, a sanitary engineering section has been organized in the Domestic Quarantine Division of the U. S. Public Health Service, according to a circular letter sent out by the Surgeon General on August 10. This arrangement "will serve to coördinate the engineering activities of the domestic quarantine division and make practicable their detailed supervision by a sanitary engineer of broad experience." One of the immediate effects is the combination of shellfish sanitation work with that of the interstate sanitary districts, the headquarters of which are now at New York, Washington, Chicago, Memphis, and San Francisco.

An article regarding the organization and work of the U. S. Public Health Service, by Surgeon General H. S. Cumming, appears in *The Trained Nurse and Hospital Review* for August, 1928. This same issue has a poignant editorial captioned "A Regrettable Veto," dealing with the Parker Bill as it affects nurses. The disapproval of this excellent measure by President Coolidge is disapproved.

Minnesota's Health Laws—About 100 pages are now required to present the health laws and regulations of Minnesota. A new pamphlet compilation of this legislation, together with appropriate opinions of the attorney general, was issued under date of February 15, 1928, by the Minnesota State Board of Health, of which A. J. Chesley, M.D., is executive officer. This pamphlet, superseding a 1924 edition, is well arranged, well printed, and has an excellent index, always a most important item in such works. If annotations to useful court decisions had been included, this book would have been even more valuable. State health departments which do not do it should issue regularly new editions of their state health laws and regulations.

The Presidency and Public Health—In their speeches of acceptance each of the candidates for election to the Presidency of the United States made brief reference to public health. This is what Herbert C. Hoover had to say, as reported in the *New York Times* for Aug. 12, 1928:

> For many years I have been associated with efforts to save life and health for our children. These experiences with millions of children both at home and abroad have left an indelible impression—that the greatness of any nation, its freedom from poverty and crime, its aspirations and ideals, are the direct quotient of the care of its children. Racial progress marches upon the feet of healthy and instructed children. There should be no child in America that is not born and does not live under sound conditions of health. . . .

The remarks by Governor Alfred E. Smith, as given in the *New York Herald Tribune* for Aug. 23, 1928, are as follows:

> I shall continue my sympathetic interest in the advancement of progressive legislation for the protection and advancement of working men and women. Promotion of proper care of maternity, infancy and childhood and the encouragement of those scientific activities of the national government which advance the safeguards of public health, are so fundamental as to need no expression from me other than my record as legislator and as Governor.

BOOKS AND REPORTS

The Validity of the Appraisal Form as a Measure of Administrative Health Practice—*By Philip S. Platt, C.P.H., Ph.D. New York: American Public Health Assn., 1928.* 102 pp. Price, $1.50.

A well-written, interesting, and carefully and scientifically prepared volume which should be read by all who have any interest in public health administration. It would have been very difficult to find a man better qualified to discuss the *Appraisal Form for City Health Work* than Dr. Platt. His field experience in surveying cities using the Appraisal Form, together with subsequent years of intensive study of the form and its uses, gives authority to the work. [The study was made largely at the instigation of the Committee on Administrative Practice of the American Public Health Association, which committee developed and published the *Appraisal Form for City Health Work.*] It is the only intensive and authoritative work thus far published on the present status of city health appraisal and has been and will continue to be of inestimable value to the Committee on Administrative Practice in discussing the revision of the Appraisal Form.

In addition to an Introduction, in which the author describes the purpose of the study, its characteristics and the collection of data, the volume contains 5 chapters devoted respectively to the Description of the Appraisal Form, Analysis of the Health Activities of the 46 cities, Validation of the Appraisal Form as a Test, Construction of the Abridged Appraisal Form, and Changes in the Appraisal Form.

As the name of the volume implies, to quote the author, " the purpose of the study is to determine whether administrative health practice as developed today in American cities can be objectively measured in a reliable and valid manner by such a measuring device as the 'Appraisal Form for City Health Work.' "

Before attempting to prove or disprove the reliability of the measure we must clearly understand what it is attempting to measure. The purpose of the Appraisal Form " is primarily to measure the extent of development of administrative health procedures and activities, public and private. It is not a measure of the effectiveness of the activities themselves, nor of the effectiveness of the public health program as a whole. It is not primarily a measure of quality of work *per se,* although indirectly quality of work is measured to a considerable degree."

There is a brief description of the history of the appraisal form idea preceding a full discussion of the development of the present Appraisal Form with its division into 11 major health activities further subdivided into 131 individual items or criteria. The author calls attention to the continual emphasis, on the part of the committee in developing the form, of the necessity of arriving at criteria, standards, and values as the result of group judgment rather than individual opinion. He likewise points out that relative values were finally fixed " from the viewpoint of the relative importance of the criteria in a well-rounded health problem as understood and developed today, not from a consideration of their absolute or potential values in preventing sickness or death."

Following a careful and comprehensive analysis of the surveys of 46 cities, the Appraisal Form as a test is discussed as to its objectivity, reliability

and validity. The general conclusions are that only 6 of the 131 criteria are likely to be sufficiently affected by differences in judgment as to class them as non-objective, that where two or more persons have been engaged in the survey of a city a divergence of opinion as to the scoring of criteria is rare, and that where a city has been re-appraised by a second individual there is a very close correlation between the two appraisals. Taking the 131 criteria and dividing them into two groups, the odd criteria being placed in one group, the even in another, and comparing the scores of each city for the two groups, there is found to be a high correlation which indicates good reliability, in that one-half of the test is practically as good as the other half. The validity of the form is shown by the close correlation which exists between the ranking of cities on the basis of scores obtained, on the one hand, and the opinion of persons having knowledge of the health practices in these cities when both are arranged in order as 1, 2, 3, etc.

The author has constructed what he terms an "Abridged Appraisal Form" based on an analysis of those criteria which best represented the major activities of which they are a part. This form represents the 11 major health activities of the longer form and contains in all 22 criteria. The correlation between scores obtained with the official form and this abridged form showed a very markedly close correlation. Such a form may well be used to make a hasty preliminary appraisal and to predict the probable result when the official form is used. It should not be used as a substitute for the Appraisal Form itself for one of the chief values of the longer form is that it makes the user think of the relationship between the various component parts of the health program.

In discussing changes the author points out the fact that the Appraisal Form has been constructed with the idea in mind of revising it from time to time as better standards and values may be worked out, and more important still, as new public health activities become generally accepted.

The entire volume is thoroughly scientific in its approach, is well illustrated with tables and figures and deductions so carefully made that we may accept with confidence the author's conclusion that the "study has produced evidence to show that, so far as can be judged at present, the principle of the Appraisal Form is sound, and its application is practicable and reliable."

The typography and make-up of the book make it readable and attractive, and the paper has been chosen to add to its appearance CARL E. BUCK

Prohibition: Its Industrial and Economic Aspects—*By Herman Feldman, Ph.D. New York: Appleton, 1927.* 415 pp. Price, $2.00.

One of the most difficult parts of the problem of estimating the effect of prohibition is the amassing of the real facts with reference to the use of alcoholic beverages. It is exceedingly easy to get thousands of opinions on this subject, but it is exceedingly difficult to arrive at a sufficient body of facts which, when judged by objective criteria, render the decision obvious. Dr. Feldman has written an exceedingly interesting book, as all books on this subject are. The very recital of contrasting opinions on the subject of prohibition must be of interest to the social-minded worker. However, Dr. Feldman attempted to go still farther than this, and by means of questionnaires distributed very widely by the American Management Association, secretaries of the chambers of commerce of the principal industrial cities of the United States, and by reference to various trade organizations' lists of members, coal mines, and electric railway associations, he has obtained a body of fundamental data used in arriving at

the conclusions of this study. In all, some 900,000 employes were engaged in those companies returning the questionnaires and including the concerns visited by the writer over 1,250,000 employes were entered on the pay-roll. Less than 80 per cent of these were males. The questionnaire covered the following six general topics: discharges and labor turnover on account of drunkenness; absences or tardiness because of drunkenness; accidents caused by excessive drinking; productivity and prohibition; general economic effects; and, finally, a statistical compilation covering the number of workers discharged, number of accidents and number of absences in pre-prohibition and prohibition years.

The author further attempts to answer certain other fundamental questions by reference to the available statistics on the consumption of various other beverages, the addiction to the drug habit and the change from the saloon as the Poor Man's Club, to sports, the radio and home.

The conclusion is finally reached that the advantages or disadvantages of prohibition must be judged over a long-time period, and on this basis the economic loss due to prohibition is not a serious problem. In addition to this, the opinion of the industrial employers and executives appears to be that prohibition is favorable to production. On this point, however, employers themselves admit their inability to provide sufficient data in addition to their opinions. There appears to be satisfactory evidence that prohibition has had the effect of stimulating the consumption of other foodstuffs, a change which has a vast economic importance in the opinion of the author. In conclusion, the author reaffirms his belief that the next few years will be the ones which will fix the status of prohibition, the results depending not on the enactment of statutory prohibition, but on the achievement of prohibition in fact.

LEONARD GREENBURG

Convalescence: Historical and Practical—*By John Bryant. New York: The Burke Foundation, White Plains, 1927.* 261 pp. Price, $5.00.

This volume, which deals in a most interesting way with the historical and practical aspects of convalescent care, has been brought out to stimulate interest in this important but as yet little recognized phase of community health service.

The review of the literature which traces the development of convalescent care from the building of the Hotel Dieu and Charité Hospital in Paris in 1640 and 1650, shows an early appreciation, by certain leaders, of the principal requirements for rapid and successful convalescence. The best features of the retreats frequented by the wealthy after illness were incorporated in these early plans for institutions for the less fortunate. The *routines* of these homes for after-care show remarkable agreement with the best practices today.

The review interprets the lack of material in the literature from 1878 to 1900 as reflecting the almost complete lack of interest in the subject in this country during that period.

The author recounts interestingly the experience from various sources such as the Burke Foundation and the Army, the practices in convalescent care which have proved worth while.

The person interested will find here rather full reporting of cases and treatments. Possibly the most important chapter is that dealing with the community aspects of the question, showing a need of one bed for convalescence for every ten beds for acute condition, and it is pointed out that deficiencies in this quota are probably more serious than a slight shortage of beds for acute illness.

A hopeful note is sounded in the review of the last few years as it is stated that nearly 3,000 beds per year are now being provided in this country for convalescence.

W. F. WALKER

Der Kokainismus.—*By Prof. Dr. Hans W. Maier. Leipzig: Thieme, 1926.* 269 pp. (22 ill.) Price, Goldmark 17.50.

In the reviewer's opinion, this is the first and only comprehensive work on the subject of cocainism. Prof. Maier is well known in the psychiatrical world as a teacher, practitioner, and writer. Having been Bleuler's right-hand man for over 20 years, he has now succeeded his chief as head of the Burghölzli Clinic of Psychiatry at Zurich.

The author starts his work with a historical description of cocainism. He describes the use of coca leaves as a food, in the form of chewing. This custom, which is still in practice among the South American Indians, existed when the Spaniards conquered the Incas. When the Spanish conquerors tried to suppress this habit among the natives, and found it impossible, they placed a heavy tax on it. As a matter of fact, it soon became a question whether chewing of coca leaves was really harmful to the average native. Moderate chewing had its defenders even then, as it has today.

In chapters II and III the author gives a full account of how the alkaloid cocain was discovered by Niemann of Göttingen. He then gives the detailed processes of manufacturing it for commercial use, its chemistry, its demonstration in the cadaver, and simple tests of its presence in the living person. The physiological effects of the drug are taken up in chapter IV.

A very interesting chapter in the cultural history of medicine is chapter V, wherein the author gives the history of the development of cocainism and its geographical dissemination since its discovery and use in medicine. The most interesting part to the reviewer is the author's description of Prof. Freud's experiments with cocain, which he began in 1883. The introduction of cocain as a local anesthetic in ophthalmology, by Koller, was largely due to Freud's works.

The evil effects of cocainism soon became apparent. The author quotes an editorial to this effect, from the *New York Medical Record* (May 29, 1886), showing that we kept abreast with Europe in this respect. Numerous reports of cocain poisoning appeared everywhere. Psychotic states, resulting from chronic cocain ingestion, were first reported by Magnan, in Paris, in 1889.

Chapter VI treats of the effects of cocainism on man. The author states that snuffing is the most frequent way of taking cocain since 1915. The physical as well as the mental symptoms given by various writers are thoroughly described.

Among the special symptomatology, Prof. Maier discusses acute and chronic cocainism, subacute cocain deliria, the cocain delusion, etc., citing many interesting clinical records.

The material upon which Prof. Maier based his observations consisted of one hundred cocain addicts observed by him, and of some case histories from other Swiss psychiatric hospitals. The male sex shows a greater representation in cocainism in Switzerland, as well as in Italy. "The treatment," the author states, "must be extremely individual. Every case has its own peculiarities. To get to the root of the evil, it is therefore necessary to make a thorough psychic examination." Prof. Maier gives a full account of the methods of procedure in the treatment of acute and chronic cocainism.

Chapter VII discusses cocainism as a social danger, the legal way of combating it by international paths, in which he shows the progress made so far, the countries participating in it, and the methods adopted.

It is unfortunate that this work is not available to English-speaking readers. The reviewer hopes that an English translation will soon be made.

A. A. BRILL

Feeding the Child from Two to Six—*Mary Frances Hartley Barnes. New York: Macmillan, 1928.* 206 pp. Price, $2.50.

This book fills a real need. It puts into practical form the essentials of dietary selection and preparation for the "runabout" ages. The author has faced the real problems of feeding children at home and in camps and institutions. She has eliminated the confusing nonessentials and put in the language of the average parent those facts about food and feeding upon which the various authorities agree. Such a contribution should be helpful to doctors, nurses, social workers and home economics students as well as parents. The references to constipation, malnutrition and certain psychological problems are merely given to suggest the common aspects of these conditions which are related to food—there are of course other causes at work in many such cases. The author appears to regard the appetite as a rather reliable guide to the quantity necessary at each meal for children who are to be kept healthy, instead of insisting upon a mathematical caloric total, and in this belief she has the support of the reviewer.

LEROY A. WILKES

How to Cook for Children—*By Estelle M. Reilly. New York: Putnam, 1927.* 245 pp. Price, $1.75.

Children these days are claiming their share of attention from nutritionists. A mother of six children has prepared a book for other mothers, based on her own experiments and the findings of psychologists, pediatricians and nutritionists. In chatty style the author analyzes the values of various foods, tells mothers how to select foods for their children and how to prepare them. Menu suggestions for the child from 18 months to 3 years are given in addition to the menus for normal healthy children over 3 years of age. A feature of the book that will help the mother who is so often perplexed about the birthday party for the runabout is the party menu for hot or cold weather. The book will whet the food imagination of any mother who is struggling to combine nutrition principles and attractive varied daily menus.

Nutrition—*By Walter H. Eddy. Baltimore: Williams & Wilkins, 1928.* 223 pp. Price, $2.50.

What comprises a complete food, what foods we need, how much we should eat, and the story of vitamines from their discovery through their analyses, and how they function, is told to the layman in a language free from technicalities. Professor Eddy has done much by his writings to familiarize the housewife with the scientific findings of the nutrition laboratory and the mother who aims to be intelligent in regard to the health building of her family can profitably add this to the home library. Business people, too, would be influenced in the selection of their foods by a reading of this book.

The Health and Happiness Series—*By S. Weir Newmayer, M.D., and Edwin C. Broome, Ph.D., LL.D. New York: American Book Co., 1928.*

Book I. The Play Road to Health. 144 pp. $.64.

Book II. Health Habits. 207 pp. $.72.

Book III. The Way to Keep Well. 264 pp. $.84.

Book IV. The Human Body and Its Care. 314 pp. $.96.

In the first book of the series health is dramatized for the very young children and in the succeeding titles, health habits, personal hygiene and keeping well, and the hygiene of individual and community are emphasized. This series has been prepared as supplementary reading work and as aids to the school health education program.

Labor Protection in Soviet Russia—*By George M. Price, M.D. New York: International Publishers, 1928.* 128 pp. Price, $1.25.

This small but exceedingly interesting book presents a very logical story of the development of labor conditions in Russia from about 1860 to the present time. It is based on three visits of the author in 1913, 1922 and 1927 to Russia, during which times he was enabled to study the conditions of labor in great detail. The book is plainly a statement of fact obtained on the occasion of these visits, and to one who is interested in the improvement of labor conditions and the development of this aspect of the social program it is a very important and succinct document.

The industrial hygienist will find much to interest him in this volume, and, judging by the progress made in Russia during the past few years along these lines, there remains much hope for major contributions from this country.

LEONARD GREENBURG

Bulletin of the Maryland State Department of Health—*Vol. 1, No. 3, April, 1928.*

This publication is the third of this nature presented by the Maryland State Department of Health. It strives to make public the more interesting and outstanding engineering studies and reports of that department.

The first two papers are concerned with shellfish. The data compiled in the one describing the oyster findings in Chesapeake Bay and its tributaries by investigations conducted from March, 1925, to January, 1927, are particularly useful at this time when the status of shellfish investigational results is still unsettled.

Two papers by Wolman, one on rational water consumption and another on the rôle of iron in the activated sludge process, are well worth reading.

Sewage treatment receives a fair proportion of space. Schaetzle has presented by himself and in collaboration with others three good reports, one on tannery waste treatment, another on the effect of liquid chlorine application to trickling filters, and a third covering observations on sludge digestion at a small treatment plant.

The last 37 pages of the pamphlet give the proceedings of the First Annual Conference of Maryland Water and Sewage Plant Operators.

ARTHUR P. MILLER

Public School Plumbing Equipment—*By Minor Wine Thomas, Ph.D. New York: Little & Ives, 1928.* 128 pp. Price, $1.50.

The aim of this book is to bring together and present the necessary criteria for judging plumbing equipment for use in the modern school. The necessary standards for the equipment of lavatories and toilets have been obtained from certain experimental evidence and from experience. In this manner the author has arrived at standards both as to material and design for the judgment of equipment to be used in the school building. A check list is provided so that each portion of the toilet room and lavatory may be judged on the basis of the standards adopted.

This volume should be of value to architects interested in the design of school buildings and to members of the school board. For the public health worker it should find good service in surveys of present school equipment.

LEONARD GREENBURG

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH. D.

Yellow Fever—Two articles presenting an interesting resumé of yellow fever on the west coast of Africa, a note on epidemiologic research, and resolutions of a conference on control methods.

ANON. Yellow Fever in British West Africa. Pub. Health Rep., 43: 31 (Aug. 3), 1928.

Preparalytic Poliomyelitis—A report of observations on 106 cases in which convalescent serum was used, which emphasizes the importance of early diagnosis. The authors conclude that convalescent serum gives a low mortality rate and low rate of paralysis, especially of the severer grades.

AYCOCK, W. L., and LUTHER, E. H. Preparalytic Poliomyelitis. J. A. M. A., 91: 6 (Aug. 11), 1928.

Midwifery Supervision—The problem of training and supervising negro midwives in Georgia is discussed. The author asks if the employment of a physician in each county to supervise the midwives is the most effective method.

BOWDOIN, J. P. The Midwife Problem. J. A. M. A., 91: 7 (Aug. 18), 1928.

Sickness Rates in Industry—A 10-year record of industrial sickness rates shows no appreciable decline. The outstanding causes are common colds and "indigestion."

BRUNDAGE, D. K. Trend of Disabling Sickness among Employees of a Public Utility. Pub. Health Rep., 43: 30 (July 27), 1928.

British Cancer Campaign—This committee report reviews British cancer mortality statistics and outlines the national and municipal activities in research and control.

BUCHANAN, G. S. Public Action in Regard to Cancer. Lancet, 2: 4 (July 28), 1928.

Progress in Nutrition—Another of the author's summaries of progress in nutritional research of clinical observations. Invaluable to the field worker interested in health education.

BURNETT, F. L. Progress in Nutrition. Northeast J. Med., July 26, 1928.

Poliomyelitis Prophylaxis—The use of convalescent serum as a prophylactic treatment against poliomyelitis in contacts is recommended—a 10 c.c. dose for children and 20 c.c. for adults.

FLEXNER, S., and STEWART, F. W. Specific Prevention and Treatment of Epidemic Poliomyelitis. New England J. Med., 199: 5 (Aug. 2), 1928.

Epidemiology of Infections—A review of our present-day knowledge of the epidemiology of poliomyelitis, diphtheria, and scarlet fever by the director of the infectious disease department of the Rudolph Virchow Hospital in Berlin.

FRIEDMANN, ULRICH. Epidemiology of Children's Infectious Diseases. Lancet, 2: 5 (Aug. 4), 1928.

Diphtheria among Immunes—Among 11,608 Edinburgh children either found immune to diphtheria or immunized there occurred 58 cases of the disease with no deaths.

GRIERSON, A. M. M. Diphtheria Occurring in Schicked and Immunized Children. Med. Off., 40: 3 (July 21), 1928.

Public Health Administration—What is wrong with health practice? Chiropractors, unsympathetic practicing physicians, untrained sanitarians, and industrial hygienists all come under

searching scrutiny. An excellent paper, all too brief.

HARRIS, L. I. Proposals for Next Steps in Preventive Medicine and Public Health. J. A. M. A., 91: 8 (Aug. 25), 1928.

Vitamin B Deficiency—The symptoms of partial vitamin deficiency—loss of weight, spasticity of limbs, rigidity of neck, restlessness and fretfulness—occurring in infants whose mothers are fed a vitamin B deficient diet disappeared when fed yeast.

HOOBLER, B. R. Symptomatology of Vitamin B Deficiency in Infants. J. A. M. A., 91: 5 (Aug. 4), 1928.

Goiter Prevention—A summary of a wide experience in goiter prevention by iodine administration, showing that it is effective and that it does not produce hyperthyroidism in old goiters. This is an effective answer to the calamity howlers who decried the general administration of iodine.

KIMBALL, O. P. The Efficiency and Safety of the Prevention of Goiter. J. A. M. A., 91: 7 (Aug. 18), 1928.

Milk Supply Supervision—The Indiana health department program is outlined. It includes maintenance of laboratory service, general dairy inspection, uniformly effective municipal ordinances, elimination of tuberculosis and contagious abortion from herds, and education of the public to demand pasteurized milk.

KING, W. F. Control of Public Milk Supplies. J. A. M. A., 91: 8 (Aug. 25), 1928.

Communicable Disease Control Measures—A plea for the search for nasal carriers of diphtheria, scarlet fever, measles, and chicken pox as a function of the local health department's epidemiologic service.

LEWIS, D. M. Insufficiencies in Methods of Control of Certain Respiratory Diseases. Med. J. & Rec., 128: 3 (Aug. 1), 1928.

Measles Prophylaxis—Another report of successful prophylaxis against measles in a child-caring institution by means of Tunnicliffe's anti-measles serum.

PETERMAN, M. G. Prevention of Measles. Am. J. Dis. Child., 36: 1 (July), 1928.

Occupational Therapy—Occupations found suitable for tuberculous patients at Leysin clinics should be suggestive for health workers interested in problems of occupational therapy.

ROLLIER, A. The Work-Cure in Surgical Tuberculosis. Brit. J. Tuberc., 22: 3 (July), 1928.

Measles Prophylaxis—A report of a series of experiences in which convalescent measles serum was found a safe and effective preventive when given in adequate dosage within the first three days after exposure.

SUTHERLAND, D. S., and ANDERSON, D. S. Serum Prophylaxis in Measles. Lancet, 2: 4 (July 28), 1928.

Relapse in Tuberculosis Convalescents—The importance of post-sanatorium care for tuberculosis convalescents is stressed in this paper. With proper aftercare 80 per cent of one group of convalescents were at work 7 years after discharge, whereas 52 per cent of a group inadequately cared for had relapses.

TAYLOR, H. L. Relapse in Pulmonary Tuberculosis. Am. Rev. Tuberc., 18: 1 (July), 1928.

Community Nursing—A discussion of the problems of oversupply of private duty nurses and failure to make a complete utilization of public nursing service.

WINSLOW, C.-E. A. The Larger Problem of Community Nursing. Pub. Health Nurse, 20: 7 (July), 1928.

ERRATA

On page 1083 of the August JOURNAL, two references to the *Northeast J. Med.* should have read *New England J. Med.*

HEALTH DEPARTMENT AND OTHER REPORTS

IRA V. HISCOCK

Detroit, Mich.—Under the title, "Detroit's Healthiest Year," the 1927 report of the Health Department is published in the January bulletin. The report opens with a statement of aims and methods. The average death rate from 1923 through 1927 was 11.6, as compared with a rate of 14.4 for the period 1913 through 1917. This rate of 11.6 represents a saving of 16,940 lives over the number who would have died if the earlier rate of 14.4 had prevailed. More striking is the decrease in infant mortality from 115.4 for the period 1913–1917 to 80 for the years 1923–1927, a saving of 5,570 babies. A very pronounced drop in the death rates of what are usually the city's most important causes of death—pneumonia and heart disease—to rates of 98.8 and 135 per 100,000 population, respectively, is noteworthy.

There was a considerable increase in rabies, from 233 animals examined with 89 positive findings in 1926 (227 people given anti-rabic treatment) to 442 animals examined with 265 positive findings (520 persons treated) in 1927. A severe type of diphtheria continues, with 11 deaths per 100 reported cases.

Results of bacterial analyses of pasteurized milk tabulated by months show that 69.8 per cent of them were below 50,000 in 1927 as compared with 55.9 per cent in 1926. This city of 1,290,000 population has an annual consumption of milk of 51½ million gallons.

In 1925 the infant mortality rate for the city as a whole was 80.1, while the rate for babies who attended the prenatal clinics of the department was 69.5. In 1926 the general infant mortality rate was 85.1, that for the 2,019 babies born to mothers who attended the prenatal clinics being 55.4.

The report abounds in excellent statistical tables and charts, accompanied by descriptive text. A classified financial statement and a personnel chart add value to the report. It is written in semi-popular style, covering problems of interest to laymen as well as to public health workers.

Palo Alto, Calif.—Palo Alto's organization chart for 1927 shows that the health personnel for this city of 11,900 consisted of a health officer, a dairy and food inspector, 2 public health nurses, a sanitary inspector, a bacteriologist, and a clerk. The latter 2 also perform certain duties for other city departments. An expenditure of $1.03 per capita is recorded. The flyleaf of the report bears an effective chart of Palo Alto Public Health Milestones, arranged on the order of the A. P. H. A. historical chart. The first health officer here was appointed in 1894 (on a full-time basis in 1910), and an assistant was added in 1914.

A death rate of 11.1 was recorded, 48.5 per cent of the 132 deaths occurring among persons over 70 years of age. An infant mortality rate of 21.9 is noteworthy, the rate in 1926 being 29.6. During the year, there was an increased incidence of poliomyelitis in the state, Palo Alto having 15 cases with no deaths. "In the control of communicable diseases a policy of always giving full publicity to the situation has been followed and has, it is felt, thoroughly justified itself."

Ten years ago, a public health nurse was first employed in this city. The plan of having the school and health department work combined and done by one set of nurses has been followed successfully since the beginning. In this arrangement the salaries and transportation of the nurses have been shared

jointly with the school board, while the supervision has been in the health department.

Colorado Springs, Colo.—Beautiful photographs of the surrounding country feature the Colorado Springs Health Department report for 1927. A psychiatric clinic was organized for work in the county, "the outgrowth of a demand which has been felt and recognized by citizens, social workers, teachers, and others interested in the health and education of children."

It is reported that during the past 15 years only 45 cases have acquired and developed tuberculosis in this city of 36,000. A review of the records of 30 cases which have died in the past 10 years shows that 14 of them were cases of tuberculous meningitis who died in infancy or childhood. These were in most instances children living with parents who were known to be tuberculous. The resident death rate from pulmonary tuberculosis for the past 10-year period is recorded as 4.4 per 100,000 population.

Improvement in the milk supply is indicated by bacteriological results. Average bacterial counts in 1925 were 144,200; in 1926, 51,700; and in 1927, 24,700. An ordinance has been framed corresponding closely with the Standard Ordinance of the U. S. Public Health Service.

Nova Scotia—The population of the province in 1927 numbered 523,837. Births are classified by counties, cities and towns, by years, the birth rate for the year ending September 30, 1927, being 21.2. A crude death rate of 11.9 and a standardized rate of 10.5 are recorded. An infant mortality rate of 90.8 is calculated, individual rates by counties varying from 43.7 to 141.7. Except for 1925 and 1926, the rate from tuberculosis has been steadily falling, and the Tuberculosis Commission is credited with a comprehensive control program.

An unusually severe outbreak of infantile diarrhea occurred in the mining district around Glace Bay during the months of August and September; 65 per cent of the 60 deaths among infants were under 9 months of age. "The majority of these infants were or had been fed on cow's milk. . . . The use of raw milk in a place where there existed no means of protecting or preserving it, in an area where outdoor toilets are extensively used, and all the conditions present for the breeding of flies, prepares the way for a very rapid spread of communicable disease of any kind once it makes its appearance." Following this outbreak, recommendations for preventing recurrence, and a set of by-laws regulating the milk supply were submitted to the council of this district. In general, fewer communicable diseases than usual were reported in the province.

Pasadena, Calif.—This 1927 Health Department report contains a table of contents, a letter of transmittal, listing outstanding features of the year's work, photographs of the new city hall in which the department is housed, a health center, and a preschool conference, good statistical charts and tables, and interesting summaries of the divisions.

The milk ordinance was amended to provide, among other things, that all milk handlers be regularly physically examined. The first annual Tournament of Health Week, May 1–7, in conjunction with the Council of Social Agencies, was sponsored. Additional health conferences were established by the child hygiene division in coöperation with the Parent-Teacher Associations. "The women of the Pasadena Civic League who assisted the inspection division of the health department during the past year and served without pay, are to be commended for their interest and work." A campaign for immunization against

diphtheria among children under 12 years of age has been waged.

This city of 80,192 population reports a general death rate of 10.9, a tuberculosis mortality rate of 53 (per 100,000), a birth rate of 14.7, and an infant mortality rate of 53.

Quincy, Mass.—The activities of the Quincy Department of Health for the year 1927 appear in a 9-page mimeographed report modelled on the scoring system adopted by the American Public Health Association. In 1926, the Field Director of the American Public Health Association appraised the activities of this city of 65,275 people. At that time a score of 711 out of a possible score of 1,000 points was reached. During 1927, the city itself surveyed its activities and considerable improvement was noted as a result of the adoption of recommendations.

A death rate per 1,000 population of 8.6 and an infant mortality rate per 1,000 live births of 56.4 are reported. Total expenditure for health work during 1927 amounted to $55,303.08; the per capita cost being 84½ cents.

Bradford, O.—The sanitary survey of Bradford, O., is the first of a series of similar surveys of the incorporated towns of Miami County, conducted under the auspices of the Miami County Board of Health. On May 3 and 4, 1928, every house was visited and the residents were interrogated with reference to the number in the family, age, sex, births and deaths and other data pertaining to water supply, milk supply, previous illness, etc. The premises were inspected with special reference to sanitary conditions of wells and toilets, the privy conditions presenting one of the largest sanitation problems of the town. A brief history of the town from its founding in 1865 is of interest, and is followed by the vital statistics report. In 1920 the town had a population of 1,503, in 1928 an estimated population of 1,050, the loss of 498 being accounted for by the removal of certain activities of the Pennsylvania Railroad from the town. During the present survey 335 homes were visited and data obtained from 231, totalling 895 persons. Of these, 453 were male and 442 female. A death rate of 14.4 and a birth rate of 22.6 per 1,000 population in 1927 are recorded. A large supply of Bradford's milk is pasteurized, and practically all milk used is controlled by the Board of Health's inspection. The per capita consumption is 0.48 pint daily.

Suggested improvements follow each separate sanitary problem discussed, and this 10-page mimeographed report concludes with a section summarizing all principal recommendations given by the surveyors.

A. I. C. P.—The 84th annual report of the A. I. C. P. reviews the association's activities for the fiscal year 1926–1927. A 2-page summary of the family welfare "services you made possible during 1926–1927" gives an enlightening survey of the type and volume of the work. The expenditures of the various bureaus and committees, with descriptions of the work of each of these sections, are listed, and total $1,276,170. Detailed events of the A. I. C. P. since its organization in 1843 graphically describe the progress which has been made during the past 84 years. A page devoted to the "Officers and Managers" is followed by a chapter entitled "The Larger Task Ahead—with yesterday's problems solved come tomorrow's unmet needs."

The last half of the report, printed on paper having a dull finish in contrast with the glossy finish of the first half, is given over to committee memberships, bequests, legacies, funds and gifts. The report is bound in blue covers and is attractively arranged with chapter or section headings well selected to arouse the

interest of the lay reader. Interspersed throughout are many excellent photographs of individuals or groups helped by the association, together with a picture of one of the 4 attractive boys' camps conducted by the A. I. C. P., where boys spend "glorious weeks of life in the woods, plunging every day in lakes and rivers, learning to be 'reg'lar fellers' by the give and take process, growing both in desire and ability to choose between things worth while and their opposite."

Brookline, Mass.—The report of the Brookline Board of Health for the year ending December 31, 1927, opens with a financial statement of the activities of the board for the past 4 years, together with a recommended budget for 1928 of $258,355, $10,084 more than the amount appropriated in 1927.

In April, 1927, a health survey was made at the joint request of the Health Department and the Brookline Friendly Society. On the basis of the *Appraisal Form* of the American Public Health Association, a total of 848 points out of a possible 1,000 was obtained; tuberculosis control, prenatal work, preschool work, sanitary inspection and water supply receiving full score.

In 1923 an intensive campaign to secure the immunization of all children was started and has been continued each year since. During the 4 years previous to 1923 there were 209 cases with 9 deaths, as compared with only 43 cases and no deaths since that year. Of these 43 cases, there were none who had had the protective treatment.

A mortality rate of 11.06 per 1,000 inhabitants in 1927, in contrast to 11.39 in 1926, is noteworthy. A total of 615 babies were born during the year, 43 of which were to non-resident parents. Thirty-eight deaths of infants under 1 year (stillbirths excluded) occurred in this city of 45,021 people (estimated as of July 1, 1927). Brief but inclusive reports of the different bureaus of the department follow the health officer's report and conclude the report.

BOOKS RECEIVED

PUBLIC HEALTH AND HYGIENE (2d ed.). Edited by William Hallock Park. Philadelphia: Lea and Febiger, 1928. 902 pp. Price, $9.00.

THE DETERMINATION OF HYDROGEN IONS (3d ed.). By W. Mansfield Clark. Baltimore: Williams & Wilkins, 1928. 717 pp. Price, $6.50.

BLOOD AND URINE CHEMISTRY. By R. B. H. Gradwohl and Ida E. Gradwohl. St. Louis: Mosby, 1928. 542 pp. Price, $10.00.

ULTRA-VIOLET RAYS IN THE TREATMENT AND CURE OF DISEASE. By Percy Hall. St. Louis: Mosby, 1928. 236 pp. Price, $4.50.

RECENT ADVANCES IN CHEMISTRY IN RELATION TO MEDICAL PRACTICE. By W. McKim Marriott. St. Louis: Mosby, 1928. 141 pp. Price, $2.50.

BACTERIOLOGY FOR NURSES. By Charles F. Carter. St. Louis: Mosby, 1928. 213 pp. Price, $2.25.

DIABETIC MANUAL FOR PATIENTS. By Henry J. John. St. Louis: Mosby, 1928. 202 pp. Price, $2.00.

SIXTEENTH ANNUAL REPORT OF THE UNITED FRUIT COMPANY, MEDICAL DEPARTMENT. Boston: United Fruit Co., 1928. 368 pp.

HEALTHY GROWTH. A Study of the Relation between the Mental and Physical Development of Adolescent Boys in a Public Day School. By Alfred A. Mumford. New York: Oxford, 1927. 348 pp. Price, $5.00.

THE HEALTH OF YOUTH. By Dr. Florence Meredith. Philadelphia: Blakiston, 1928. 535 pp. Price, $1.60.

THE GENESIS OF EPIDEMICS AND THE NATURAL HISTORY OF DISEASE. By Clifford Allchin Gill. New York: Wood, 1928. 550 pp. Price, $7.50.

SOCIAL WORK AND THE TRAINING OF SOCIAL WORKERS. By Sydnor H. Walker. Chapel Hill: University of North Carolina Press, 1928. 241 pp. Price, $2.00.

NEWS FROM THE FIELD

HEALTH NEWS FROM TENNESSEE

TENNESSEE now has 23 full-time health departments. One was recently organized in Knox County, with Dr. A. E. Richards as director. The department staff will consist of the director, two nurses, a sanitary inspector and a clerk. Another full-time health department has also been organized in Monroe County.

Dr. John Shell has been appointed full-time director of the Carter County Health Department at Elizabethton, Tenn. Dr. Shell recently completed the training course for health officers given by the Tennessee State Health Department and Vanderbilt Medical School.

OPTIMISTIC "NO DIPHTHERIA" REPORT FROM QUINCY

MORE than 3,700 boys and girls of Quincy, Mass., have been immunized against diphtheria at clinics conducted by the local health department since the inauguration of its toxin-antitoxin treatment in May, 1927. The appeal for the protection of their children against diphtheria was made directly to the parents. Of the 3,700 receiving treatment more than 3,000 have been of school age. Quincy reports that since 1923 there has been a consistent decrease in diphtheria morbidity rate and the first 8 months of 1928 show a decided decrease over previous years. The records of the health department also show that no child who has been successfully immunized has contracted diphtheria. Now Quincy is endeavoring to eliminate diphtheria among preschool children by the establishment of weekly diphtheria prevention clinics and by seeking the coöperation of parents of preschool children.

VISION OF SCHOOL CHILDREN TESTED

OF 2,000 school children examined by a specialist in defects and diseases of the eye under direction of the U. S. Public Health Service, 45 per cent needed glasses for school work. The children examined were representative of the general school population. The Surgeon General calls attention to the necessity of making visual tests of school children at least twice a year to detect nearsightedness which may progress rapidly within a year. The report shows that the nearsighted eye can usually be detected by the Snellen chart test. Farsightedness can always be discovered by this test chart.

It was discovered that 60 per cent of the children may read normally on the vision test chart and 32 per cent of these are definitely farsighted and are constantly straining the eyes in near work.

NEW ENGLAND HEALTH INSTITUTE

AT the Sixth Annual New England Health Institute held in Burlington, Vt., in September the several aspects of public health were discussed. Emphasis in the program was placed on preventable diseases, sanitation and engineering, tuberculosis, child hygiene, public health nursing, the relation of social work to public health, mental hygiene, industrial hygiene, food, drugs and nutrition.

The institute was directed this year by Charles F. Dalton, M.D., secretary of the Vermont Department of Public Health, and it was sponsored jointly by

the State Health Departments of New England, the U. S. Public Health Service, several New England colleges and voluntary health agencies.

SEWAGE CONFERENCE AT CLEBURNE, TEX.

A SPECIAL sewage field conference was held at Cleburne, Tex., August 27, to discuss the recent developments of vacuum degasification at the Cleburne sewage disposal plant. This plant began its operations January 1, 1928, and the work accomplished seemed to merit further study according to the sanitarians who were influential in calling the August conference together. From reports of those in charge of operations of the plant it is claimed that this new process minimizes odors, increases the rate of sedimentation, and sludge digestion, eliminates foaming, and is helpful for the entire purification cycle.

Dr. J. C. Anderson, Texas State Health Officer, was chairman of the conference, and Dr. F. E. Giesecke, director of Engineering Research of Texas A. & M. College, was vice-chairman. Several valuable papers on the process were read, and briefer contributions made by engineers and sanitarians from several western and southwestern states.

NEW SECTION ON SANITARY ENGINEERING OF U. S. PUBLIC HEALTH SERVICE

A SECTION on sanitary engineering has been established in the Domestic Quarantine Division of the U. S. Public Health Service, to coördinate the engineering activities of the Domestic Quarantine Division and make practicable their detailed supervision by an experienced sanitary engineer. One of the pieces of work to be directed immediately will be the combination of the shellfish sanitation program with that of the interstate districts. Heretofore the office of shellfish sanitation has existed as a separate unit.

Field offices have been established in many of the interstate sanitary districts of the country.

CINCINNATI FINANCES A HEART PROGRAM

THE Community Chest of Cincinnati, O., has appropriated $7,350 for the first year's work of the Cincinnati Heart Council recently established and the Amanda Bernheim Foundation has made an appropriation of $5,000.

MISSOURI WATER CONFERENCE MEETS

THE Fourth Annual Meeting of the Missouri Conference on Water Purification will be held at Hannibal, Mo., November 15, 16, 17, 1928. The program will include topics on the following subjects: Water purification, deep and shallow well supplies and sewage treatment.

TEXAS SANITARIANS TO HOLD SHORT SCHOOL

THE Sixth Annual Texas Sanitarians' Short School will be held November 7–10, at San Antonio, Tex., with headquarters at Gunther Hotel and the City Health Department.

Dr. W. A. King, City Health Officer of San Antonio, president of the Texas Association of Sanitarians, is director of the school. Dr. J. C. Anderson, State Health Officer, is chairman of the program committee and he is being assisted by C. M. Adams, J. Bryan Miller, Mary Kennedy, Dr. W. A. Dunn, Dr. A. H. Flickwir and Dr. L. H. Martin.

This short school is one of the series arranged for intensive training of sanitarians and is sponsored by the Texas State Department of Health, the Texas Association of Sanitarians, the American Public Health Association and local health departments. The committee anticipates an attendance of 300.

PERSONALS

DR. GERTRUDE STURGES, formerly Assistant Director of the Cleveland Health and Hospital Survey, and for 3 years assistant executive secretary of the New York Associated Out Patient Clinics, has been appointed a member of the staff of the Committee on the Cost of Medical Care, Washington, D. C.

ALDEN MILLS, formerly Secretary of the Portland City Club, Portland, Ore., and Allon Peebles, instructor of economics at Columbia University, New York, N. Y., for the past 4 years, have recently accepted appointments to the staff of the Committee on the Cost of Medical Care, Washington, D. C.

DR. FRANK J. FULLER, Health Officer of Potsdam, N. Y., since 1915, died August 4.

THOMAS B. OSBORNE, PH.D., for forty-two years chief of protein research of the Connecticut Agricultural Experiment Station, New Haven, Conn., has retired from active directorship of the laboratory, and Hubert B. Vickery, Ph.D., is in charge. Dr. Osborne assumes the title of advisory biochemist.

DR. CHARLES H. NIELSON, president of the St. Louis City Medical Society, has been appointed Associate Dean of St. Louis University School of Medicine to succeed the late Dr. Don R. Joseph.

DR. RAPHAEL B. DURFEE, Bisbee, Ariz., was elected president of the Arizona Public Health Association.

DR. FRANK C. STORY has taken up his duties as health officer of Wayne County, Ga.

DR. FREDERICK E. JACKSON has been elected president of the Indianapolis, Ind., Board of Health.

FREDERICK L. HOFFMAN, LL.D., of the Prudential Life Insurance Company, Newark, N. J., on his return from a transcontinental air journey, stopped in the Navajo country to assist the Bureau of Indian Affairs with the census of the Indians.

JANE C. ALLEN, for the last two years general director of the National Organization for Public Health Nursing, New York, N. Y., recently presented her resignation.

DR. ALBERT E. KYTE, Health Officer of the town of Montgomery, N. Y., died recently. Dr. Kyte had been health officer there since 1926.

W. C. BLASINGAME, who has held the position of director of the bureau of venereal diseases in the Alabama State Department of Health, has resigned to accept a position as director of the bureau of citizenship in the extension department of the University of Alabama, at Tuscaloosa.

DR. DOUGLAS L. CANNON has been appointed acting State Health Officer of Alabama, with full authority, until further notice. This vacancy was created through the death of Dr. S. W. Welch, who had been State Health Officer for many years.

GEORGE A. COOPER of the Monongahela West Penn Public Service Company, Fairmont, W. Va., has been appointed an Assistant Chief Business Specialist in the Division of Simplified Practice of the Bureau of Standards, U. S. Department of Commerce.

DR. EDWIN W. BATHURST has been appointed Health Officer of Edna, Calif.

DR. FRED J. WAMPLER has been appointed Professor of Preventive Medicine in the Medical College of Virginia, at Richmond, and Medical Director of the outpatient department. The September JOURNAL stated, in error, that these positions were in the University of Virginia.